THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

Published every Thursday Morning by David Williams Co., 232-238 William St., New York.

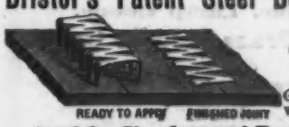
Vol. 74: No. 4. *New York, Thursday, July 28, 1904.* $5.00 a Year, including Postage. Single Copies, 15 Cents.

Library of Congress Copyright Office 18 Jul 1905 Washington D.C. 1904 PERIODICAL

Reading Matter Contents.....page 50
Alphabetical Index to Advertisers " 161
Classified List of Advertisers.... " 153
Advertising and Subscription Rates " 160

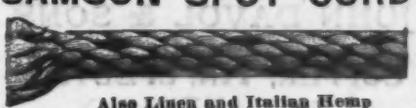
IRON AND STEEL PRODUCTS
REPUBLIC IRON & STEEL COMPANY
CHICAGO, ILL.

Bristol's Patent Steel Belt Lacing.



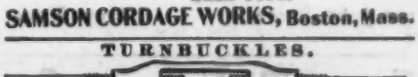
SAVES Time, Belts, Money.
Greatest Strength with Least Metal.
Send for Circulars and Free Samples.
THE BRISTOL CO., Waterbury, Conn.

SAMSON SPOT CORD

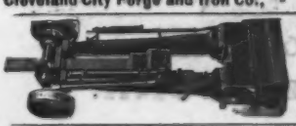


Also Linen and Italian Hemp Sash Cord.
SAMSON CORDAGE WORKS, Boston, Mass.

TURNBUCKLES.



Branch Office. 11 Broadway, New York.
Cleveland City Forge and Iron Co., - Cleveland, O.



MERRILL BROS., 485 Kent Ave., BROOKLYN, N. Y.

FOUNDRY IRON.

PILLING & CRANE, Girard Building, Phila. Farmers' Bank, Pittsb'g Empire Bldg., New York Board of Trade, Boston.

"An old acquaintance (Semper idem) Always the same."

See Page 24.

U.M.C. METALLIC CARTRIDGES

are the satisfactory kind. Never misfire or lead the barrel. Dealers should carry a full line of U. M. C. Metallics to meet the increasing demand. Half sold before they are offered to the retailer. Latest improvements to meet changing conditions.

U. M. C. has but one quality—
U. M. C. QUALITY.

THE UNION METALLIC CARTRIDGE COMPANY

Agency: 313 Broadway, New York. BRIDGEPORT, CONN. Depot: 86-8 First St., San Francisco, Cal.

CAHALL BOILERS See Page 112

PLATE PATTERN.

Capewell Horse Nails

CORRUGATED PATTERN.

NEW YORK, PHILADELPHIA, CHICAGO, ST. LOUIS, BOSTON,
Branches:
DETROIT, CINCINNATI, SAN FRANCISCO,
PORTLAND, ORE., BUFFALO, BALTIMORE, NEW ORLEANS, DENVER.

THE CAPEWELL HORSE NAIL CO., Hartford, Conn.

SAID AN ENGINEER

"Yes, they did not know about valves at the time the plant was put in, but they do now. I am replacing all valves with the genuine *Jenkins Bros.*"

BENJAMIN FRANKLIN SAID

"Experience keeps a dear school. Remember this: they that will not be counseled cannot be helped."

Start your plant with *Jenkins Bros. Valves* and avoid trouble.

JENKINS BROS., New York, Boston, Philadelphia, Chicago, London.

"Swedoh" Cold Rolled Steel is unexcelled for **Drawing** and **Stamping**

THE AMERICAN TUBE & STAMPING COMPANY
(Water and Rail Delivery) BRIDGEPORT, CONN.

SEE PAGE 26.

MAGNOLIA METAL.

Best Anti-Friction Metal for all Machinery Bearings.

Fac-Simile of Bar. Beware of Imitations.

MAGNOLIA METAL CO.,

Owners and Sole Manufacturers, Chicago, Fisher Bldg. 113-115 Bank Street, NEW YORK. San Francisco, New Orleans, Montreal, Boston, Pittsburg and Philadelphia. We manufacture all grades of Babbitt Metals at competitive prices.

THE QUEEN'S RUN FIRE BRICK CO.
High Grade
FIRE BRICK
"QUEEN'S RUN" "LOCK HAVEN" "WEST BRANCH"
SPECIAL SHAPES
LOCK HAVEN, PA.

BRASS { SHEET ROD WIRE
COPPER { SHEET ROD WIRE
GERMAN SILVER { SHEET ROD WIRE
LOW BRASS. SHEET BRONZE. SEAMLESS BRASS AND COPPER TUBING. BRAZED BRASS AND BRONZE TUBING.

THE PLUME & ATWOOD MFG. CO.,
MANUFACTURERS OF
Sheet and Roll Brass
—AND—
WIRE
PRINTERS' BRASS, JEWELERS' METAL, GERMAN SILVER AND GILDING METAL, COPPER RIVETS AND BURRS.
Pins, Brass Butt Hinges, Jack Chain, Kerosene Burners, Lamps, Lamp Trimmings, &c.
29 MURRAY ST., NEW YORK.
144 HIGH ST., BOSTON.
199 LAKE ST., CHICAGO.
ROLLING MILL: THOMASTON, CONN. | FACTORIES: WATERBURY, CONN.

Randolph-Clowes Co.
Main Office and Mill,
WATERBURY, CONN.
MANUFACTURERS OF
SHEET BRASS & COPPER.
BRAZED BRASS & COPPER TUBES.
SEAMLESS BRASS & COPPER TUBES
TO 36 IN. DIAM.
New York Office, 253 Broadway, Postal Telegraph Building, Room 715.
Chicago Office, 603 Fisher Bldg.

WATERBURY BRASS CO.,
WATERBURY, CONN.
99 John St., New York. Providence, R. I.

Bridgeport Deoxidized Bronze & Metal Co.,
BRIDGEPORT, CONN.
Automobile Castings a Specialty.
High Tensile Strength.
Bronze and Aluminum Alloys.
Write Us.

SCOVILL MFG. CO.,
MANUFACTURERS OF
BRASS,
GERMAN SILVER
Sheets, Rolls, Wire
Rods, Bolts and Tubes,
Brass Shells, Cups, Hinges,
Buttons, Lamp Goods.
Special Brass Goods to Order.
FACTORIES:
WATERBURY, CONN.
DEPOTS
NEW YORK, CHICAGO, BOSTON.

JOHN DAVOL & SONS,
DEALERS IN
COPPER, TIN, SPELTER, LEAD, ANTIMONY.
100 John Street, - New York.

Matthiessen & Hegeler Zinc Co.,
LA SALLE, ILLINOIS.
SMELTERS OF SPELTER
AND MANUFACTURERS OF
SHEET ZINC AND SULPHURIC ACID.
Special Sizes of Zinc cut to order. Rolled Battery Plates.
Selected Plates for Etchers' and Lithographers' use.
Selected Sheets for Paper and Card Makers' use.
Stove and Washboard Blanks.
ZINCS FOR LECLANCHE BATTERY.

Arthur T. Rutter & Co.
256 Broadway,
NEW YORK.
Small tubing in Brass, Copper, Steel, Aluminum, German Silver, &c. Sheet Brass, Copper and German Silver. Copper, Brass and German Silver Wire. Brazed and Seamless Brass and Copper Tube. Copper and Brass Rod.

BRASS FOUNDERS FINISHERS J. J. RYAN & CO.
68-74 West Monroe St., Chicago.
Best Bronze, Babbitt Metals Brass and Aluminum CASTINGS On Short Notice.

"PHONO-ELECTRIC" WIRE. "IT'S TOUGH."

TROLLEY, TELEPHONE and TELEGRAPH LINES.
Mills Bridgeport, Conn.
BRIDGEPORT BRASS CO., 19 Murray St., New York.

Brass, Bronze and Aluminum CASTINGS
FOUNDERS—FINISHERS.
W. G. ROWELL CO., Bridgeport, Conn.

HENDRICKS BROTHERS
PROPRIETORS OF THE
Belleville Copper Rolling Mills,
MANUFACTURERS OF
Braziers' Bolt and Sheathing
COPPER,
COPPER WIRE AND RIVETS.
Importers and Dealers in
Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.
49 CLIFF ST., NEW YORK.

Thermodynamics and Chemistry. A nonmathematical treatise for chemists and students of chemistry. By P. Duhem. Authorized translation by George K. Burgess. 445 pages, 140 figures. Cloth.....$4.00
For sale by David Williams Co., 232 William St., N.Y.

THE IRON AGE

THURSDAY, JULY 28, 1904.

The Walker Tool Room Grinder No. 2.

To produce a more completely universal grinder than has heretofore been made, and one of large capacity and comparatively light weight, the Walker Grinder Company, Worcester, Mass., has brought out the tool illustrated herewith. Primarily, the machine is intended for cutter grinding, but it may also be used for grinding miscellaneous work. Aside from the No. 2 machine, here shown, there is also a new No. 1 of smaller size, and a No. 3 of a heavy pattern, fully automatic, with multiple variable speeds for all moving parts.

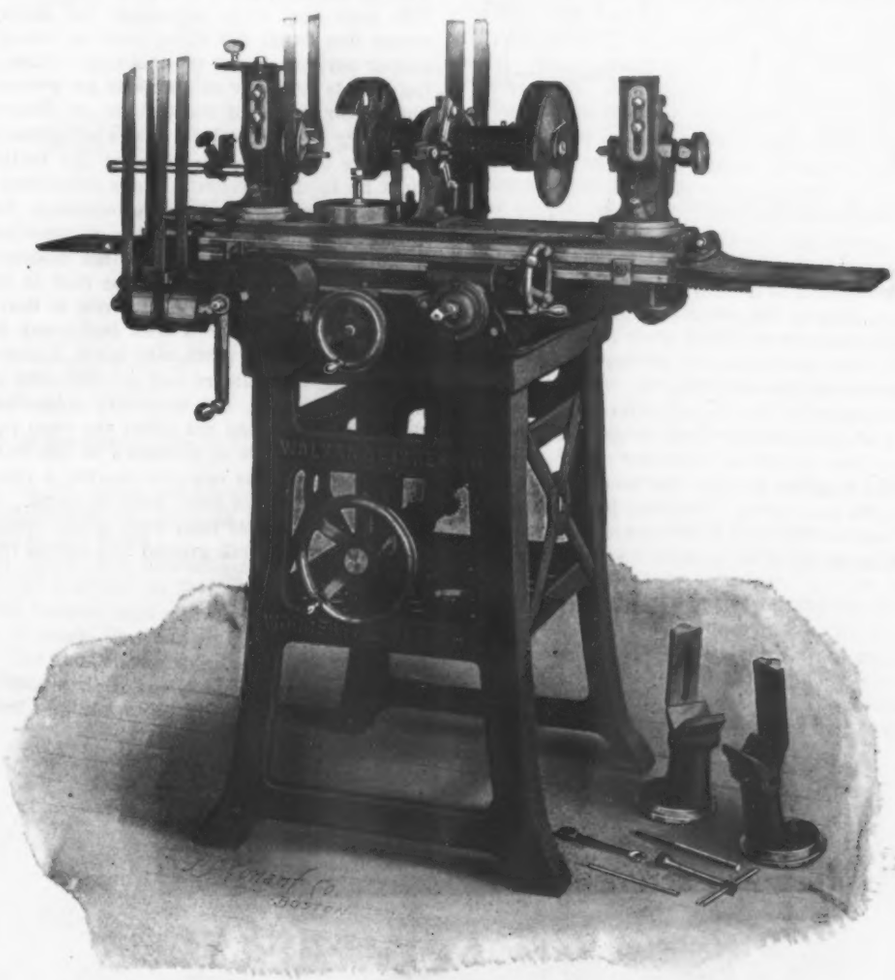


Fig. 1.—The Walker No. 2 Universal Tool Room Grinder.

The No. 2 machine has a capacity of 25 inches between centers, and with its two sets of interchangeable heads swings either 9 or 14 inches. The grinding head can be raised or lowered 10 inches and swung around 180 degrees horizontally or 90 degrees vertically without altering the tension of the belt or interfering with its running. It has an automatic feed attachment, and also an arrangement for feeding by hand by means of a worm and worm gear, shown at the right of Fig. 1. The machine is also built in a form known as the plain No. 2 grinder, on which the automatic feed and longitudinal hand screw feed of the bed are omitted. Arranged as shown in Fig. 1, the machine is adapted for grinding work on dead centers. By removing the centers the V-troughs of the heads may be used for holding a heavy cutter on its own arbor. Should this work prove to be too long to be supported between centers in either position, as shown in Fig. 1, both heads may be moved to one side of the wheel in use and a bar of indefinite length supported with the cutter overhanging.

Fig. 2 shows in detail the construction of one of the center heads. The lugs *a* on the bottom of the heads locate them in the T-slot of the table. In this slot is fitted the nut *b*, tapped at an incline to receive the binding screw *c*. The clamping forces the lugs against one side of the T-slot, insuring perfect alignment. When it is desired to swivel one of the heads a graduated pedestal is interposed between the head and the table, and a vertical bolt is passed through the hole *d* in the head to clamp it to the table. The action of the gripping device is also shown in Fig. 2. The jaw *e* is held by the screw *f*, around which is a coiled spring, allowing the jaw to conform to the work when forced down by the screws *g*. *h* is a floating center held in a T-slot in the stop *j*.

Fig. 3 illustrates one of the unique capabilities of the machine, where it may be seen that one of the V-heads is transformed into a universal cutter holder, in this case supporting a face cutter. The tooth rest is held on the top of the head and may be swung in a horizontal plane to give different positions without changing the vertical adjustments. Clearance is obtained on the cutter by tilting the grinding spindle instead of the work, as may be seen. The grinding head has also been turned 90 degrees

horizontally from the position shown in Fig. 1, the belt running on quarter turn.

The provision for tilting the spindle has several advantages, one of which is that with the use of a beveled emery wheel a dulled reamer can be sharpened by grinding its radial faces without affecting its diameter. The toothed face to be ground lies in a horizontal plane, and the surface facing is done from the cutting edge toward the center of the reamer. The spindle being turned to a vertical position, allows other desirable operations. For

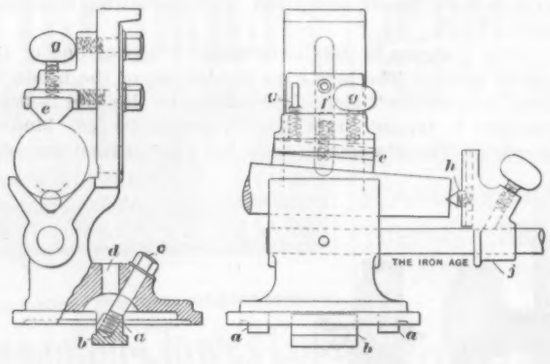


Fig. 2.—Detail of a Center Head.

instance, a cupped emery wheel may be placed in the spindle, in which case it is usually necessary to insert an extension sleeve, raising the spindle head to obtain sufficient overhang. Special forms of work holders may be used on the bed for operations of horizontal surfacing, such as the grinding of planer knives, &c.

Fig. 4 shows clearly the construction of the spindle support, and incidentally illustrates the manner of grinding clearance on cutter or reamer teeth. *a* is the spindle post, which slides through the housing *b*, and is clamped by a quill not shown. The post is operated vertically by the screw *o* through miter gears and the horizontal shaft *d*, upon which is mounted an operating hand wheel with micrometer graduations. This shaft is journaled in a bracket which swivels on the housing *b*. Midway in the hight of the housing is an eccentric flange, *e*, which is dovetailed and fitted to the column top *f*. The vertical side of the driving belt passes through the center of the eccentric flange and rotates with the housing when the latter is adjusted. The idler *g*, vertically adjustable to take up any stretching of the belt, moves with the housing, allowing the belt to run at a quarter turn when the head is rotated either way to a 90-degree position. A loop is formed in the vertical side of the belt, which passes between idlers, *h* and *i*, to the spindle pulley *j*. The idler pulleys *h* and *i* being close to the grinding spindle allow the latter to be tilted or moved to a vertical position without undue distortion, and the lower idler *g* being fast to the housing allows the grinding head and post to be adjusted vertically any amount without altering the belt tension. The housing flange *c* is fastened by two clamps, only one of which is shown at *k*.

In grinding clearances on cutter or reamer teeth the cutting point must meet the work in a horizontal plane with its axis. Accordingly to facilitate setting, a reading line *l* is marked on the post, which, when set, coincides with the top of the housing and will bring the head and tail centers and wheel axis in the same horizontal plane. This is the setting for grinding taper or revolving work. The next step is to determine the distance above the center line *l* that the wheel must be raised to obtain the proper backing off for the tooth, for which a second reading line is made at *m*. This is an average line, and to obtain variations in the amount of clearance it is only necessary to set the head above or below it, the guiding principle being that the face of the tooth being ground must lie in the horizontal plane coincident with the axis of the cutter. This being established, the tooth rests, blades and holders are made of standard total hight to conform with the hight of the centers from the top of the platen. After setting the post to proper position, the tooth rest bracket *n* is clamped so that the bottom of the tooth rest holder *o* will just clear the top of the platen. Since the tooth rest blade *p* and support *q* are fitted against shoulders and all clamping surfaces are in horizontal planes, the necessary adjustments for position of tooth rest do not affect the vital point of vertical setting. The blade *p*, as shown in the small detail view, is slotted near one edge to provide a ratchet action, as the cutter is moved from tooth to tooth. A blade of the form shown at *r* is used with spiral cutters. The ends of this blade are both ground to a radius from the point *s*, coinciding with the point of the center of the clamping screw *t*. Consequently, the blade can be swung in either direction without altering the hight. By turning the grinder head to a vertical position a cupped wheel could be employed with the spindle tilted so as to grind a flat clearance instead of the usual concave resulting by grinding as shown in Fig. 4. In grinding flat clearances

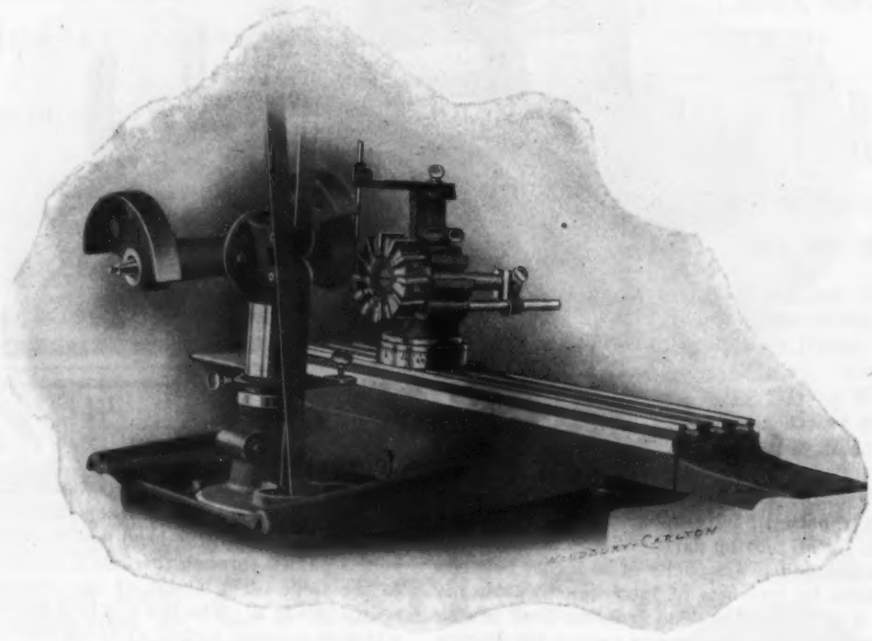


Fig. 3.—The Machine Set for Grinding an End Face Mill.

the tooth rest holder *o* is usually fastened to the top of the platen *u* instead of the bracket *n*, and for work of small diameter a center with long projecting end is furnished to allow the cupped wheel to pass the end of the work. By mounting the reamer with its radial faces up-

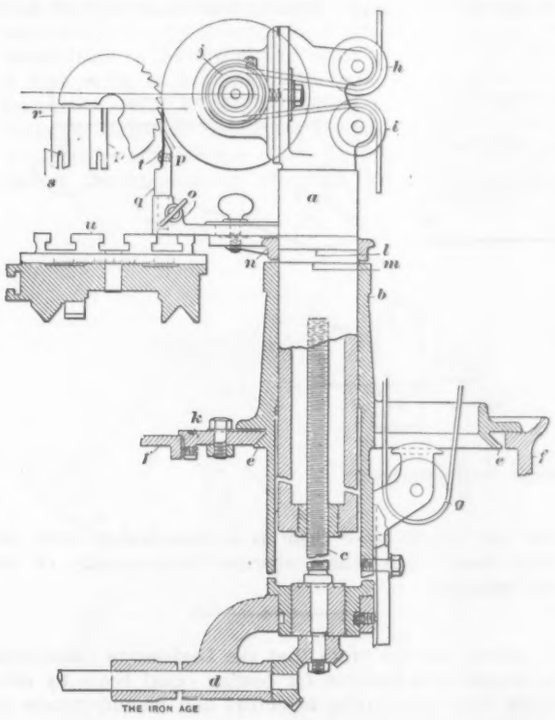


Fig. 4.—Detail of the Construction of the Spindle Support.

ward and placing the tooth rest above instead of below it, a means is obtained for grinding clearances against the cutting edge of the tooth.

A universal chuck and independent spindle may be furnished with the machine, to be used as shown in Fig. 5 in place of the regular head center and face plate, for holding pieces of work that cannot be centered in any other manner. The independent spindle sleeve and the tail spindle sleeve being exactly the same diameter, the work is held in perfect alignment. Since the top of the platen may be swiveled, and one end is graduated in inches per foot, the machine may be readily set for grinding taper in the manner illustrated.

In connection with the chuck and spindle just described an internal grinding attachment may be employed. With this in use a driving pulley is substituted for one of the emery wheels, which drives an internal spindle by a short endless belt. The latter is supported by a jointed extension bracket secured to the wheel spindle. The device resembles the one used on the original Walker tool and cutter grinder, but has two important improvements, the first of which is the substitution for the old swivel jointed arms of telescopic arms, greatly increasing the rigidity. Another improvement consists in the use of a positive stop on the grinder head in place of the old hight gauge formerly used. Three sizes of spindles are made, ¼, ⅜ and ½ inches in diameter, respectively, which may be used interchangeably by inserting bronze bushings of proper size.

In Fig. 6 are illustrated the details of the automatic feed attachment. The bed has a cross feed movement on the V-tracks *a*. *b* is the sliding carriage with the ends broken away and *c c* are the operating pinion shafts, having squared ends to receive a hand crank. The transverse sectional detail at the left is taken on the line C D of the side elevation and shows the driving worm *d* and the worm gear *e* mounted on the intermediate pinion sleeve *f*. The next detail to the right is a cross section on the line A B through the pinion shaft and clutch gear *g*. The key *h* is in a chambered recess in the gear *g* and is drawn into a radial groove across the hub *j* by pulling on the rod *k*, to throw the device into gear, pinion *f* intermeshing with gear *g*. The automatic feed is operated by shifting belts after the manner of a planer, except that an instantaneous reverse is effected by coiled springs attached to the belt shipper, which are first compressed and then tripped at the proper moment. The right hand detail is a section on the line E F and shows the worm and gear that compose the hand screw feed attachment. The box casing carrying the worm *l* is lifted and clamped out of mesh with *m* when not in use.

The matter of providing variable speeds was perhaps as difficult a problem as any connected with the design of the grinder, for the time is past when one or two speeds suffice for a machine carrying wheels ranging from 3 to 8 inches in diameter. It is also becoming recognized that finer graduations of speed are desirable than may be obtained by step pulleys. For those desiring a moderate priced counter one has been produced capable of three speeds. The hangers carry two shafts, the upper or main one driving the lower one from a three-step cone pulley. A more complete variable speed device is shown in Fig. 7, which is a development of the simpler form made by a few changes and additions. It is capable of the finest graduations in speed from maximum to minimum and is provided with an index and dial at each end for guidance in regulating. The drum is hung low enough to permit the main driving belt to pass over it, so

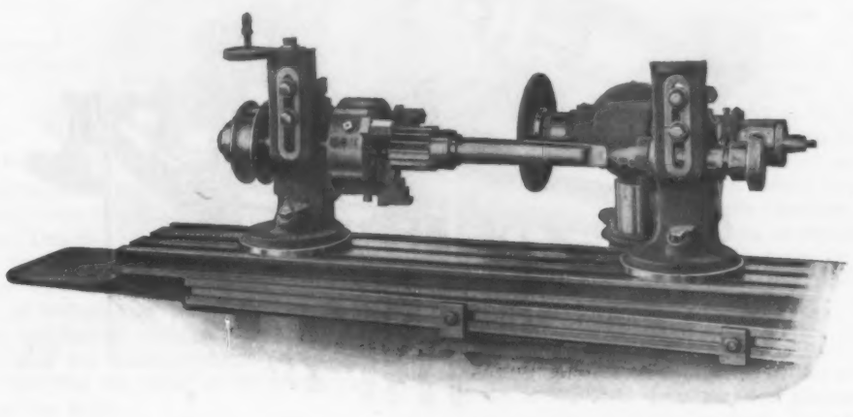


Fig. 5.—The Machine Set for Grinding a Taper Shank.

that the drive may be from either side. The shippers and shipper rods are arranged for either open or crossed belts. The journal boxes are self aligning and ring oiling.

Fig. 8 shows a detail of the disk drive feature of the counter illustrated in Fig. 7 and the manner of producing flexibility in the thick wedge shaped belt by saw kerfs on the inner face. It will be seen that the disks *a* and *b* are forced together by coiled springs *c* abutting on a collar, *d*, which is fast to the shaft. This causes the beveled edge belt *e* to be automatically crowded toward the circumference of the disks *a* and *b* as much as the

upper disks *f* and *g* will allow. The latter are operated by the pendent rod *h* through bevel gears and the horizontal screw *i*, impinging on a hardened steel button in the hub of the disk *f*. When this screw is withdrawn disk *f* is free to move to the left, and is caused to do so by disk *b*, due to the action of the springs *c*. Thus the belt, always in alignment, will alternately approach or recede from the centers of the two shafts and vary the speed of the driven one.

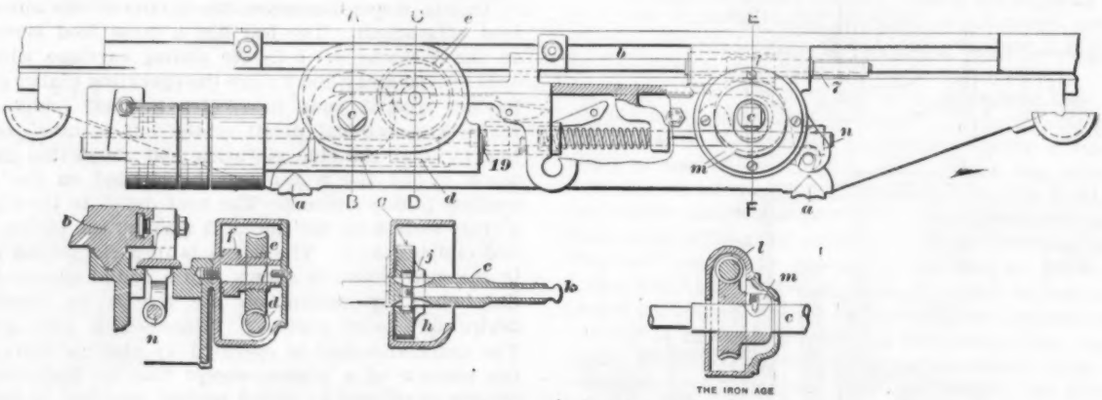


Fig. 6.—Details of the Automatic Feed Attachment.

This method of speed variation is not new, but originality is claimed for the index dial in connection with the device. The action of the indicator *j* is shown in the illustration. The figures on the dial indicate the proper size of grinding wheel to use at the speed corresponding to the position of the indicator. A similar beveled disk drive may be seen on the right end of the counter in Fig. 7, for varying the speed of the drum which drives the work spindle of the machine when the latter is in use. The drum disks are mounted on a sleeve which ordinarily runs free on its shaft, but by turning the handle of a hanging controlling rod a shipper is caused to release a taper friction, which, actuated by a coiled spring, locks the device to the drum shaft. All adjustments and the starting and stopping of the main counter are effected in the same manner by turning a handle on a pendent rod.

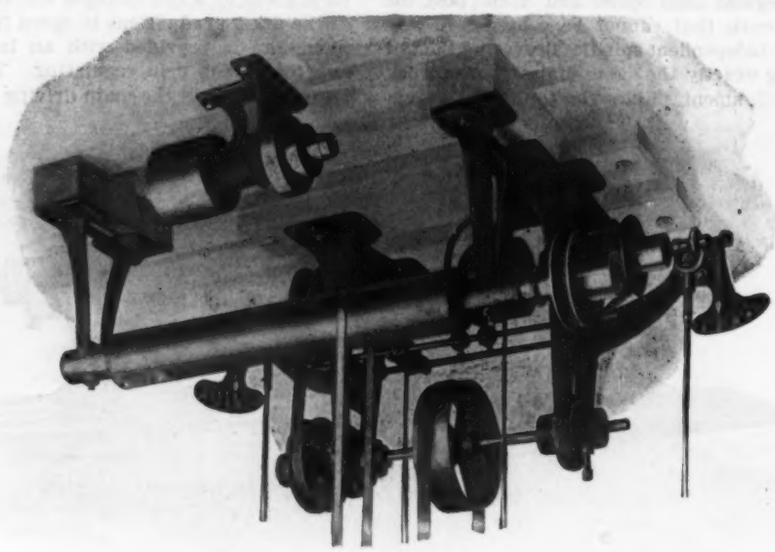


Fig. 7.—The New Variable Speed Countershaft for the Walker Grinder.

The Inland Company's Sheet Mill Closed Indefinitely.—The Inland Steel Company, Chicago, started all its works in operation last Monday except the sheet mill. The sheet plant is to be closed down indefinitely, as the firm refuses to sign the Amalgamated scale. The officers of the company contend that they cannot afford to place their sheet mill in the hands of a union which in the past attempted to compel them to pay 15 per cent. more wages than were paid by any competing mill, particularly as only 47 men in their employ were members of that union. They state that over 70 per cent. of the sheets produced in this country are made by mills not in the Amalgamated Association, and that all their competitors on pickled sheets are nonunion. Signing the Amalgamated scale, they say, would place them at a disadvantage with 137 other sheet mills which operate independently of the Amalgamated.

Albany advices state that the Legislative Committee to inquire into systems for towing canal boats by electricity will soon invite inventors and manufacturers to lay before it any plans they may have for the electrical propulsion of boats. The committee inspected the Wood system at Schenectady recently and seemed to think the system practicable. The impression of a number of State officers is that this system will be recommended by the Legislative Committee next year, as a proper one for the State to adopt. In case a report of that kind is accepted and a law enacted authorizing the superintendent of public works to direct the installation of the system on the present canal, the result, according to some officers, may be so striking and conclusive that the proposed barge canal and the expenditure of $101,000,000 may be shown to be altogether unnecessary.

The Pere Marquette Railroad opened its line to Buffalo and the Suspension Bridge for freight service July 18. It will connect with all Eastern trunk lines at the two points named. The Pere Marquette has also arranged through its Buffalo connections to share in the

handling of the tonnage of the Lackawanna Steel Company.

Census Report on the Mica Industry.

WASHINGTON, D. C., July 23, 1904.—The report of the Twelfth Census upon the mica industry, which has just been completed by Joseph H. Pratt, shows remarkable fluctuations in the output and value of this product since it first came to be separately reported by the Census Bureau in 1870. Other interesting tendencies based on changing industrial conditions are also recorded, notably the large recent increase in the production of sheet mica and in the importation of scrap mica. The following

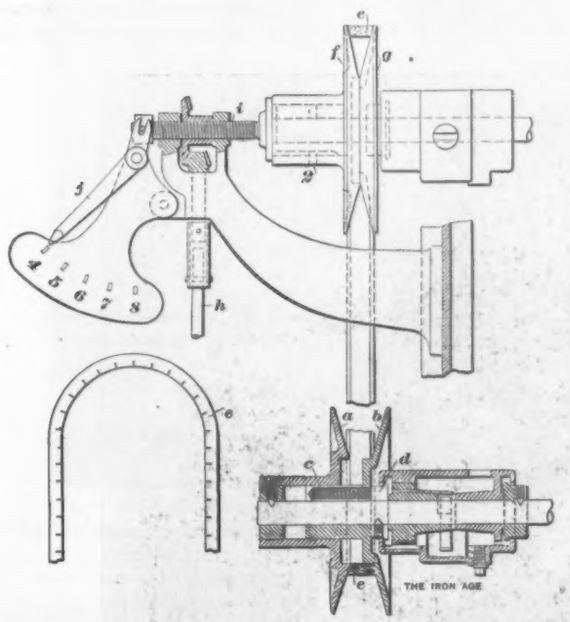


Fig. 8.—Detail of the Disk Drive on the Countershaft.

table embraces a comparative summary of the statistics from 1870 to 1902:

	1902.	1889.	1880.	1870.
Number of mines	49	*	*	*
Number of operators	38	*	*	*
Salaried officials, clerks, &c.	21	*	*	*
Salaries	$13,444	*	*	*
Wage earners	98	185	272	24
Wages	$44,043	$42,174	$65,600	$5,000
Miscellaneous expenses	$12,914	$8,753	*	*
Cost of supplies and materials	$11,961	$7,408	$6,110	$85
Value of product	$118,849	$52,450	$127,825	$7,000

* Not reported.

Distribution of Mines and the Production.

The 49 mines reported in operation during 1902 were located in the following States: North Carolina, 28; California, 10; South Dakota, 3; Maine, 2; New Hampshire, 2; Virginia, 2; Georgia, 1, and New Mexico, 1. Of the 38 operators, 26 were in North Carolina, 3 in South Dakota, 2 each in Maine, New Hampshire and Virginia, and 1 each in California, Georgia and New Mexico. North Carolina was the main producer of mica in the United States. In 1902 the value of its production was 59.8 per cent. of the total.

The production reported in 1902 was 373,266 pounds of cut or sheet, 1028 short tons of scrap and 372 short tons rough as mined. This production of sheet mica is about five times that reported in 1880 and nearly eight times for 1889; but the total value, $118,849, of all the mica produced in 1902, although much more than that shown for 1870, is $8976 less than the value of the production reported at the census of 1880. This is due in part to the somewhat higher prices received in 1880, and also to the very large quantity of small disks and sheets cut in 1902 for electrical purposes.

Changes in the Industry.

The principal changes in the mica industry since the census of 1890 have resulted from the utilization of the scrap mica, which was formerly thrown away as valueless, and the cutting of large quantities of small disks 1 inch in diameter, and small sheets 1 x ½ inch and 1 x 2 inches for electrical purposes. This waste having become of value, it is possible to work properties which would otherwise be unprofitable. Many new uses for both sheet and scrap mica have been devised during the past few years, so that although there has been a very large falling off in the amount of sheet used in stoves (which was formerly the principal use of mica) the quantity of all mica used has greatly increased.

The large increase in the production of sheet mica during the past few years has been accompanied by a large decrease in the production of scrap mica. This decrease is accounted for by the fact that most of the scrap mica now produced is that obtained as waste in the present mining or cutting of the sheet mica, where formerly a very large percentage put on the market was obtained from old dumps from former mining.

The imports of mica for 1902 amounted to 2,251,856 pounds, valued at $466,332, which is an increase over the importation of 1901 of 574,291 pounds, valued at $131,278. The main point to be noticed, however, is that this increase is greater than the total value of the production of mica in the United States during 1902, showing that the increasing demand for mica in this country is being supplied largely by foreign countries.

Sheet and Scrap Mica.

Mica is cut into sheets of various sizes, which are used for stoves, lamp chimneys, incandescent lights, and in electrical apparatus for insulation purposes. While the use of this sheet mica for stoves has decreased very rapidly during the past ten years, there has been a corresponding increase in its use for electrical apparatus. It is also used in place of glass in the manufacture of a great many novelties and in many respects increases the usefulness of the articles made. There was formerly a considerable demand for the larger sheets of mica, but these have been replaced to some extent at the present time by a manufactured product known as micanite, which is made from very small, perfect pieces of mica arranged and cemented together into larger sheets. For some purposes these manufactured sheets are as satisfactory as the natural ones and are, of course, much cheaper.

The waste or scrap mica which has not been found suitable for cutting into sheets of even the smallest size has a value when ground to a flour, which is used in the manufacture of wall papers, lubricants, fire proofing material, artificial snow, novelties, &c. Coverings for boiler tubes and steam pipes are also manufactured from particles of scrap mica which are not ground, but are broken into pieces of approximately the same general dimensions, ½ x ¼ inch. These are then arranged with their longer dimensions and faced parallel to the length of a wire net coil, pressed into the shape of a pipe or tube, against which the layer of scrap mica is kept tightly in place by means of heavy canvas. A number of the States, especially North Carolina, offer very favorable locations for the erection of plants to manufacture products from scrap mica, as there is usually a supply of available water power near the deposits.

The Amalgamated Association has appointed John J. Buckley as its representative on the Conciliatory Board to settle the iron scale between the association and the Republic Iron & Steel Company. Mr. Buckley resides at Youngstown and was formerly vice-president of the eighth district of the association. The Republic Company has named Henry W. Heedy as its representative. Mr. Heedy is secretary and treasurer of the Andrews & Hitchcock Iron Company, at Youngstown, Ohio. The two selected will name a third to adjust the scale.

The armored cruiser "South Dakota" was launched at San Francisco, Cal., July 21. She is a sister ship of the "California," which was launched three months ago also at the yards of the Union Iron Works. The two ships are almost identical, and are the largest war vessels ever launched at a Pacific Ocean port.

Pumping and Air Compressing Machinery at the St. Louis Exposition.—II.

The Exhibit of C. H. Bradley, Jr., & Co.

High speed, vertical, reciprocating engines of large size have reached their greatest devolpment in England, due perhaps to the fact that engines used on steamships are of that type. The engine shown by C. H. Bradley, Jr., & Co., Pittsburgh, in block 52, aisle 11, Machinery Building, was originally developed by Willans & Robinson, Rugby, England. It is a triple expansion engine, the steam ports and valves between the three tandem cylinders being located in the common piston rod. There are two sets of cylinders, the cranks on the common shaft being set at right angles. The engine on exhibition is

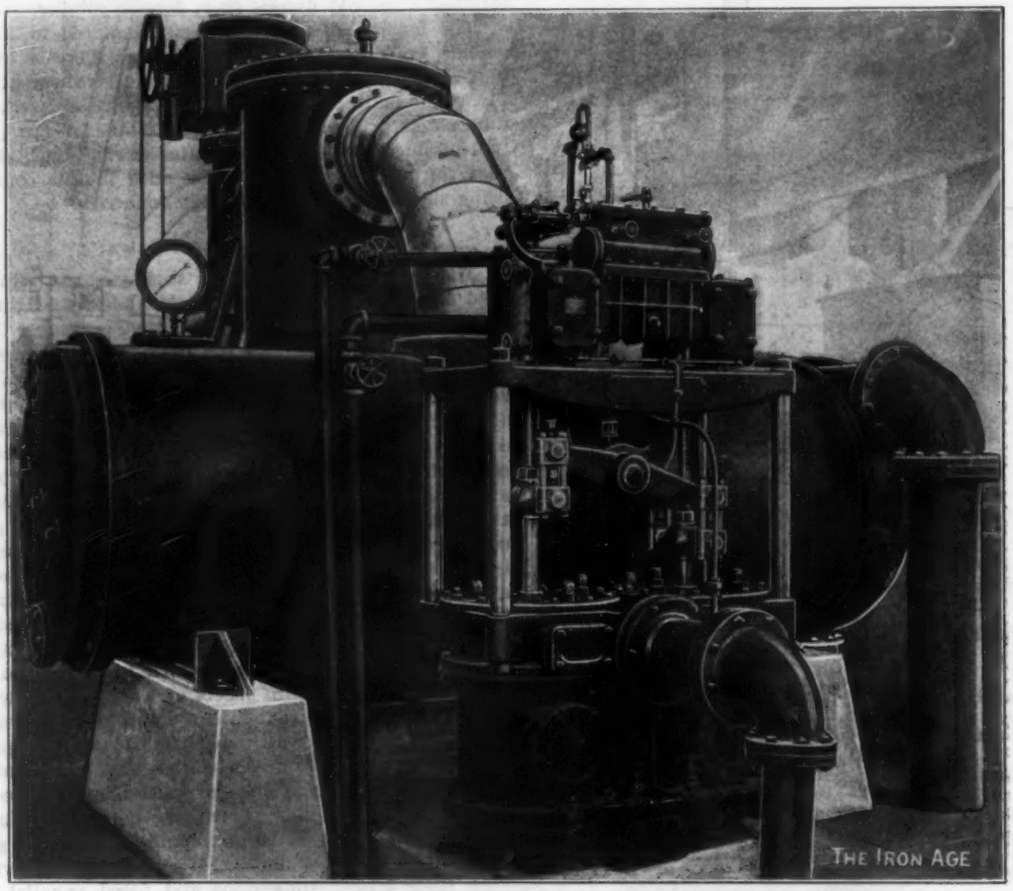


Fig. 17.—Condensing Outfit for Willans Engine, 2000 Square Foot Surface Condenser, Vertical Twin Beam Vacuum Pump and Volute Circulating Pump.

used in the Exposition arc lighting service, and has the distinction over most American machines of being built in accordance with the metric system throughout.

The condensing apparatus seen in Fig. 17 consists of a 2000 square foot Worthington condenser, a Blake vertical, twin beam, air pump and an 8-inch Worthington volute circulating pump. The vertical twin air pump was originally developed by the George F. Blake Mfg. Company for marine service. There are two air cylinders placed side by side in a vertical position, with the steam cylinders directly above, the two piston rods being connected by a walking beam. A crank on the shaft of the walking beam operates the slide valve of a small cylinder, the piston of which is in reality the driving engine of the main steam cylinder valves. This is not a dry vacuum pump, but is intended to handle both air and the water of condensation. Its operation is noiseless and regular, the auxiliary valve mechanism giving complete and accurate control of the motions of the main pistons.

Exhibit of the Ice & Cold Machine Company.

There is only one exhibit of refrigerating and ice producing machinery on the Exposition grounds. This has been installed by the Ice & Cold Machine Company near Intramural Station No. 9, University Way. An ice machine consists essentially of a pump handling carbonic acid gas, hydrogen sulphide, air, or some other gaseous medium, and driven by a steam engine or other prime mover. In the present case a steam engine is used, which, in order to obtain condensation (distilled water) for making ice, as well as to improve the engine economy, is run condensing, exhausting into an 1800 square foot Worthington surface condenser. The tubes of this condenser are of seamless drawn brass and the tube heads are carefully drilled and tapped to receive screw glands. The latter are adjustable and permit of free movement of the tubes during expansion or contraction, and can be readily removed to permit replacing the packing. The cooling water for these condensers is taken from the Lagoon. To remove the air which always accumulates in a surface condenser a Worthington wet vacuum pump of the duplex type is used, having 10-inch steam cylinders, 14-inch air cylinders and 10-inch stroke. The peculiarity of the wet vacuum pump is that the air pistons are always submerged, preventing leakage and doing away with the necessity for lubrication. The steam piston valves used in this pump are perfectly balanced, requiring little or no oiling, making it possible to operate the pump with very little attention.

Fire Protection for the Exposition.

The buildings of the Columbian Exposition at Chicago were constructed of steel, yet that Exposition experienced a destructive and fatal fire, entirely consuming the large Cold Storage Building. The buildings of the present Exposition are constructed largely of wood, but such elaborate precautions have been taken in the provision of fire fighting apparatus that a great fire is considered impossible. All buildings have been supplied with stand pipes and hose connections, so that it will be unnecessary for firemen to bring hose to the scene of a blaze. There are two entirely independent water supply systems. One of these receives its supply directly from the city mains, and the other, a high pressure service, is

supplied by fire pumps in the Steam, Gas and Fuel Building. Although the first is spoken of as a low pressure service, the pressure ranges from 50 to 100 pounds over different parts of the grounds. The high pressure system is constructed of wrought iron pipe and has been tested at 300 pounds pressure. Its lines within the buildings are carried in trenches, from which branches are run up to the roof, where there are connections for 1½-inch hose. In addition, there are sprinkler systems in some of the buildings, which have connections for outside

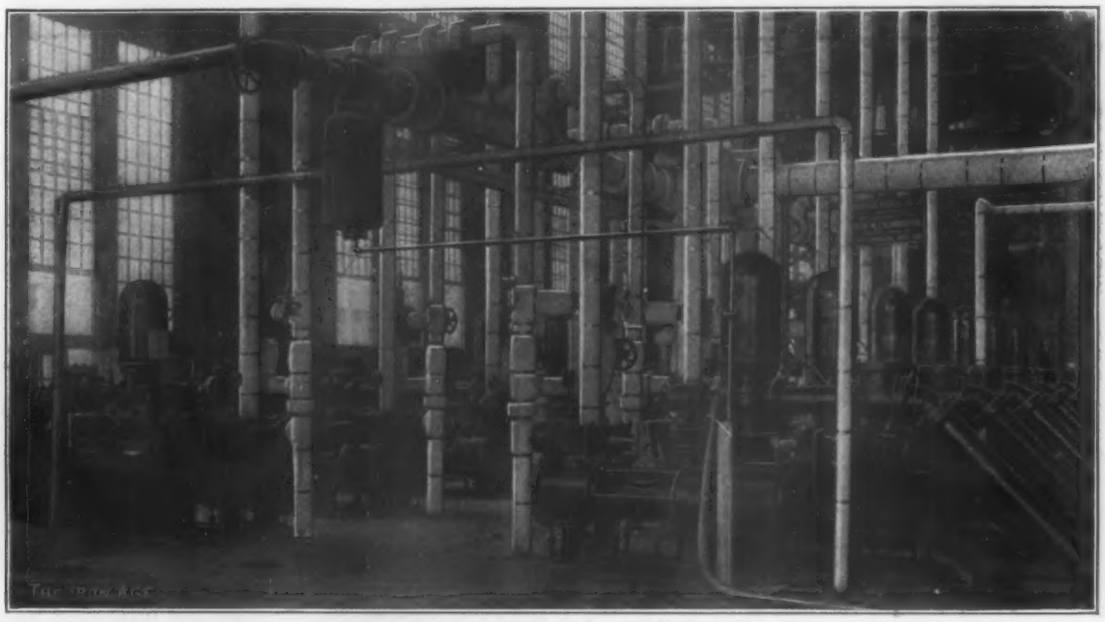


Fig. 18.—Fourteen Underwriter Fire Pumps, Each with a Capacity of 1000 Gallons Per Minute, Located in North Side of Steam, Gas and Fuel Building.

fire engines, as well as regular connections with the interior piping, and there are frequent cross connections between the high and low pressure mains. Hose lines and Babcock fire extinguishers are scattered throughout all buildings. Further, in the main buildings there are 2 and 3 inch turret monitors, such as are used on fire boats. These are very powerful and will never be used except in extreme cases, as the jet from one of them would wreck all the exhibits in its path.

The high pressure mains are supplied by 14 Worthington Underwriter pumps, Fig. 18, equipped with Fisher governors set to maintain a pressure of 150 pounds per square inch. They are located on the north side of the Steam, Gas and Fuel Building and discharge into a 20-inch main, which branches into two 16-inch lines. The water supply for these pumps is taken from a 12-inch city main along University Boulevard, or if necessary from Arrow Head Lake, which is one of the features of the Philippine exhibit, and has a capacity of 900,000,000 gallons. The pumps are each of 1000 gallons per minute capacity, capable of supplying four fire streams, making it possible to have 56 streams playing at one time. The pumps are of the duplex, double acting type and are supplied with air and vacuum chambers of large capacity. The fittings are of composition metal througout, and the pistons and valve rods are of bronze. This entire set of pumps is kept in constant motion at slow speed to avoid possible delay in case of fire.

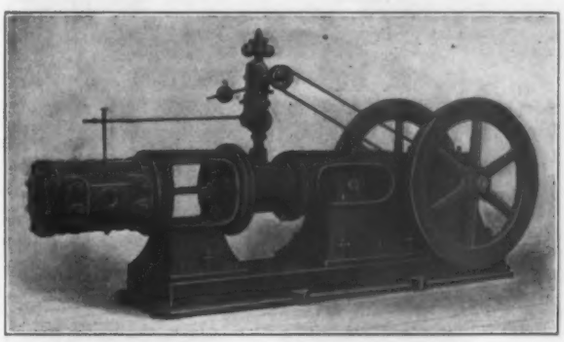


Fig. 19.—Clayton Air Compressor in the Lord & Ayer Timber Preserving Plant.

The Acme Water Storage System.

The apparatus exhibited by the Acme Water Storage & Construction Company, in block 44, aisle 9, Machinery Building, is intended to make possible the constant supply of water under high pressure, as, for instance, for tall buildings, country residences and small municipal water works, displacing water towers or elevated tanks. The system involves the use of two air tight tanks, a pump and an air compressor. One tank is kept constantly charged with air at a high pressure, while the other contains both air and water, the air being admitted to the second tank from the first by a pressure reducing valve set to give constant pressure in the second tank and the water being forced into the tank by a pump. The

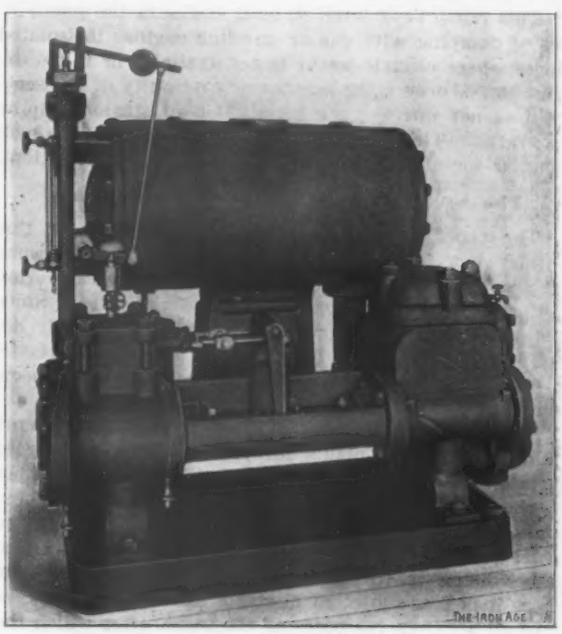


Fig. 20.—One of the Automatic Pumps and Receivers in Service in the Restaurant of the Hanley-Casey Company.

entire contents of the water tank may be used under a constant pressure without operating either the compressor or pump, and it is necessary to run the latter only at such times as are found convenient for charging the system. As the water is pumped into the water tank the air is removed by the compressor and returned to the air tank, so that the water pump always operates against a uniform pressure.

The apparatus exhibited includes two tanks, each 5 feet in diameter and 10 feet long, and an air compressor and a pump operated by a single 5 horse-power gas engine. The pump is of the Deane vertical, triplex, geared type, and is fitted with 4-inch cylinders, the plungers in which have a stroke of 6 inches. These pumps are designed for a pressure of 100 pounds per square inch and a speed of 47.3 revolutions per minute, the speed of the gas engine being 280 revolutions.

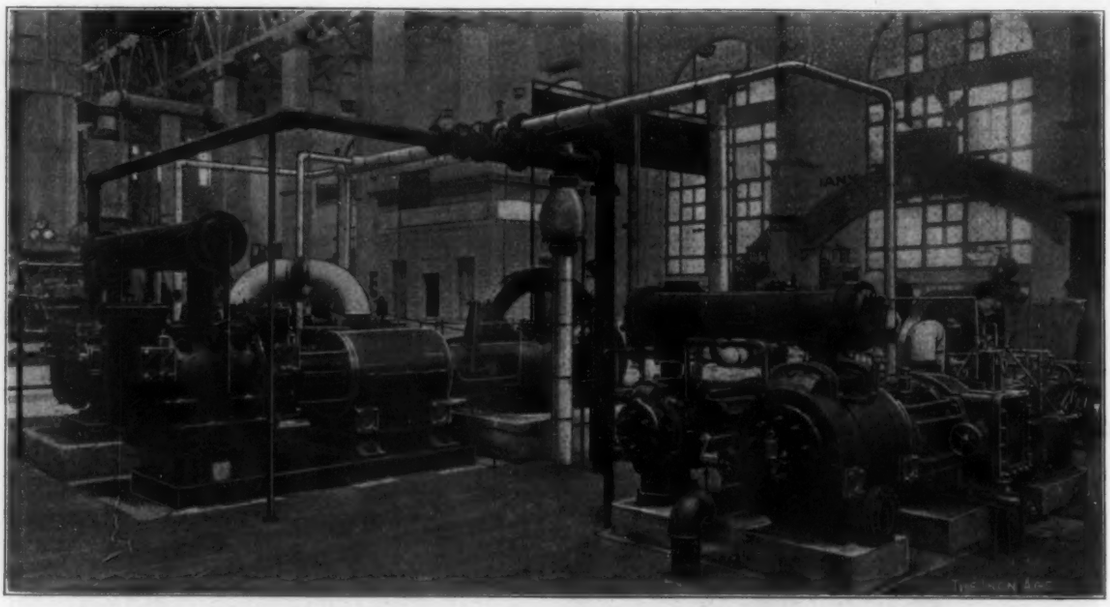


Fig. 21.—Compressed Air Plant in Machinery Building.—Left Hand Machine is for General Service and Right Hand Machine for Transportation Exhibit.

This pump is of interest, as it indicates the possibilities of pumping with gas or gasoline engines in isolated places where electric power is not available or is too expensive, and where the amount or continuity of the service does not warrant the installation of steam pumping apparatus. This type of pumping equipment seems well adapted for all places where the service is intermittent.

The Ayer & Lord Timber Preserving Plant.

The rapid destruction of the great forests of this country has forced upon the railroads a very serious problem in connection with the supply and preservation of timber and outdoor construction, especially ties. Since the supply of timber for this purpose will probably decrease as time goes on, many efforts have been directed to perfecting processes to preserve the ties from insects and decay.

The Ayer & Lord Tie Company, Chicago, has erected a number of large plants for this purpose in different parts of the country and has placed on exhibition west of the California and South Dakota gold mines exhibits, between Intramural Railway Stations 12 and 13, a model plant, capable of doing commercial work. The timber being treated is placed in air tight cylinders, where it is first subjected to steam under pressure to remove all air from the pores of the wood, after which the air and steam are exhausted. For producing a vacuum, a Deane single cylinder, horizontal, direct acting, wet vacuum pump is used, in which the piston rod stuffing box and the piston are submerged. After all vapor and gases are removed, creosote is pumped into the tank and forced into the wood by pressure. The pressure pump in this equipment is designed to work against 300 pounds pressure per square inch, and is of the Deane duplex type with double plungers instead of pistons. The advantage of the plunger type of pump is that the packings are on the outside where leakage is immediately detected.

A single cylinder, fly wheel air compressor, having a 6-inch steam cylinder, a 6-inch air cylinder and 6-inch stroke, is next used to force air into the tank, displacing the creosote and returning it to an elevated storage reservoir. This machine, built by Clayton Air Compressor Works, is shown in Fig. 19. The air cylinder of the compressor is completely water jacketed, both on the sides and heads, and the valves and seats are self contained and removable. The fly wheels are extra heavy, so that the machine will operate satisfactorily at a very low speed, if necessary.

The Hanley-Casey Company's Exhibit.

The Hanley-Casey Company has installed in the southeast corner of the basement of the Forestry, Fish and Game Building, in connection with its exhibit, a Deane triplex, electric motor driven, 4 x 4 inch pump. This pump is designed to supply 60 gallons per minute against 100 pounds pressure, and is used for raising water to an elevated tank containing a live fish exhibit. The motor is run at 1200 revolutions per minute, and is connected to the pump by rawhide pinions. At the Irish Village and also at the Administration and Fire Fighters' restaurants this company employs steam for cooking, using Blake

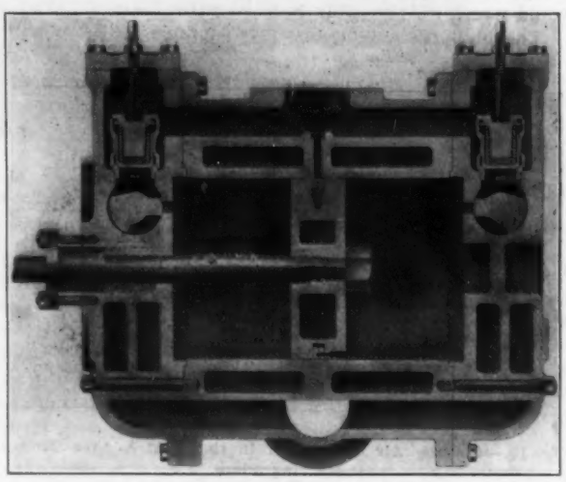


Fig. 22.—Cross Section of Air Cylinder of Laidlaw-Dunn-Gordon Compressor, Showing Valves.

automatic pumps and receivers, of the form shown in Fig. 20, for returning water of condensation from the kitchens to the boilers. This apparatus is designed to remove the water of condensation from steam coils, jackets, radiators, &c., and to return it automatically to the boiler. It consists essentially of a cylindrical closed receiving vessel and a steam pump, a float inside the former controlling the pump which forces the water from the receiver to the boiler.

The Compressed Air Plant.

At the Exposition many classes of apparatus requiring compressed air will be shown in operation, the air being furnished by two large compressors located in block 33

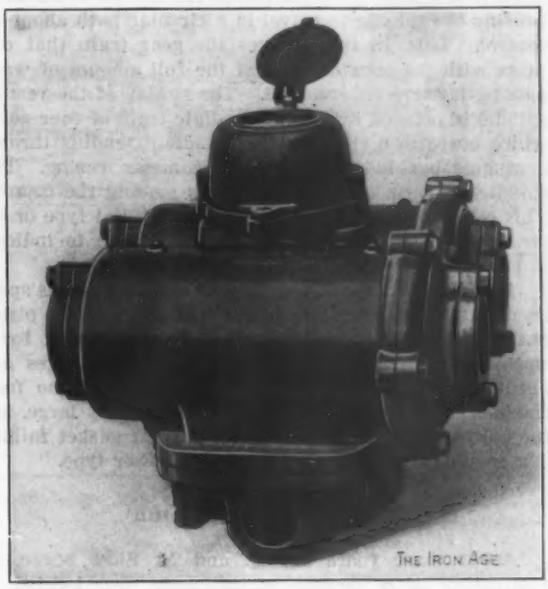


Fig. 23.—Worthington Duplex Piston Meter.

of the Machinery Building and shown in Fig. 21. One of the machines has a capacity of 1300 cubic feet of free air per minute when running at 125 revolutions, and is used to supply the general compressed air requirements of the Exposition, while the other is capable of furnishing 530 cubic feet and supplies the transportation exhibits. The large machine is fitted with an improved type of valve gear, the distinguishing feature of which is the novel manner of using poppet valves for controlling the opening of the discharge in combination with the semirotary, mechanically moved valves for controlling the closing of the discharge and the opening and closing of the suction.

It is recognized that mechanical valves are best for controlling the opening and closing of the suction in a compressor cylinder, since a full opening into the cylinder is assured, with a sharp and quiet closing of the suction without the use of the heavy springs necessary in poppet valves. This mechanical control is a comparatively simple matter, since the points at which the suction should open and close remain the same, no matter what the discharge pressure may be, and lately the better classes of compressors have been so arranged.

Mechanically moved valves are even more important for the discharge, since the throttling effect of heavy springs causes an even greater loss on the discharge than on the suction. Heavy springs have been necessary, however, to insure sharp closing of the discharge valves at the end of the stroke and to avoid wasteful leakage back into the cylinder at the beginning of the return stroke. In attempting to control the discharge mechanically difficulty has been experienced, because the point of opening of the discharge varies, being early or late in the stroke according as the discharge pressure is low or high. Obviously a variable mechanical control of this point cannot be obtained without a complicated gear of the releasing type, which is apt to be quite as noisy as a poppet valve, and requires comparatively slow speeds. Only the opening of the discharge is variable; the closing should occur at a fixed time at the end of the stroke. This fact has suggested a solution of the problem, which has been embodied in the large compressor here exhibited.

A mechanically moved valve of the semirotary type is placed in each end of the cylinder, Fig. 22, controlling not only the opening and closing of the suction, as in previous designs, but also controlling the closing of the discharge. This valve opens to the dicharge early in the stroke, but a series of poppet valves placed directly over the rotary valve prevent communication between the interior of the cylinder and the discharge pipe until the compression in the cylinder has reached the discharge pressure. These poppet valves then open and remain open until after the mechanical valve has closed the discharge from the cylinder at the end of the stroke, having a cushion of high pressure air underneath, and the entire return stroke in which to seat themselves. In this manner the necessity for heavy discharge valve springs, which is the chief objection to the poppet discharge valves, is obviated, and noiseless operation with a minimum amount of air friction is insured, the complete elasticity and simplicity of the ordinary poppet construction being retained. By means of this gear the speed restriction due to the appreciable time required for the seating of the poppet valves is removed, and, as in the case of the steam engine, the only remaining speed restriction is the valve area, which may be proportioned for high efficiency at speeds impossible in a poppet valve machine.

The steam valve of this compressor is designed to include the usual advantages of separate Corliss steam and exhaust ports with small clearance and correspondingly high economy, the Corliss releasing gear, however, with its consequent speed restriction, being eliminated.

The small compressor, which furnishes air for the transportation exhibits, is fitted with a semimechanical valve gear controlling the opening and closing of the low pressure suction only. The chief point of interest in this machine is the fork frame construction, involving the use of a solid forged crank shaft, instead of the usual built up type.

Water Meter Exhibit.

Closely allied to pumping machinery are devices for measuring liquids. In fact, the designs of most water meters have been developed from some form of pump. This is especially true of the duplex piston meter, Fig. 23, exhibited by Henry R. Worthington, which very closely resembles in the functions of its parts the duplex

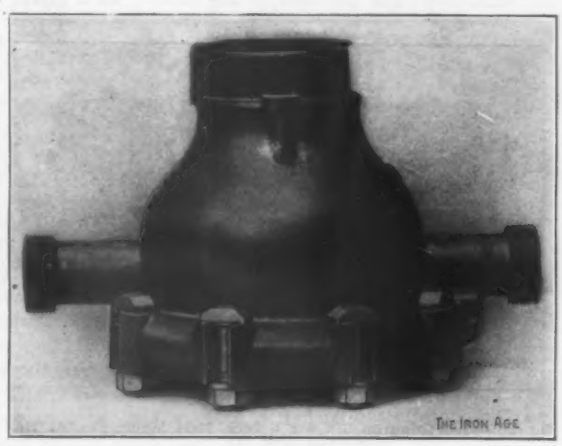


Fig. 24.—Worthington Disk Water Meter.

pump. Two double acting pistons are arranged in parallel cylinders, each by its own motion operating the valve of the other piston. Since no water can pass through the meter without complete strokes of the pistons, all the water is accurately measured. The strokes of the piston are counted by a train of gears moving pointers upon a dial face. This meter has been in use for over 50 years and has found a wide application, not only in connection with domestic water supply, but also for measuring liquids of all kinds, such as beer, molasses, oil, &c. It is accurate in operation and causes no appreciable diminution of the pressure of the water passing through it.

One of the most interesting applications has been to the measuring of the water supplied to steam boilers, a special hot water meter having been developed for that purpose. The use of a hot water meter makes it easy to test the steam making values of different fuels and to keep a record of boiler plant economy. Its use shows when the boiler is overtaxed or affected by scale or soot, when the method of firing is inefficient, the furnace defective or the coal of poor quality. The piston type of

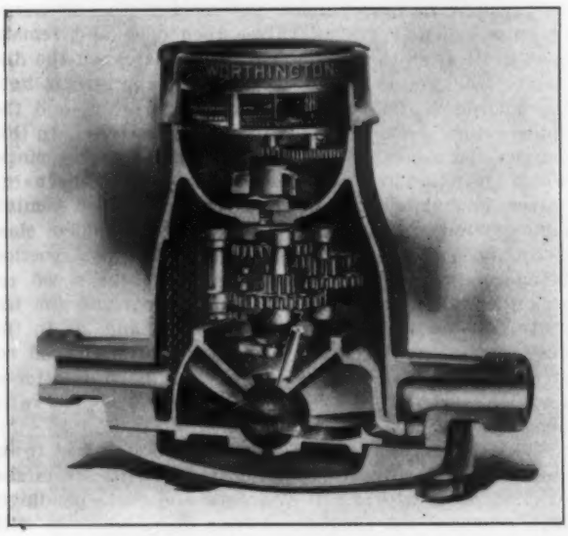


Fig. 25.—Section of Disk Water Meter.

meter, when used for measuring hot water, is fitted with adjustable buffers in the heads, by which the length of stroke of the plungers may be regulated for calibration and adjustment. A similar type of meter is also used for measuring beer, vent cocks being provided in the tops of the cylinders for the escape of air and gas, and handles being attached for convenient handling. For measuring crude oil, petroleum and naphtha special meters are also constructed. The firm has on exhibit duplex meters for general water works service, and also for use in measuring hot water, beer and oil.

In water works service, however, the piston type of meter is largely superseded by the disk type, because of the smaller weight and cost of the latter. In a meter of

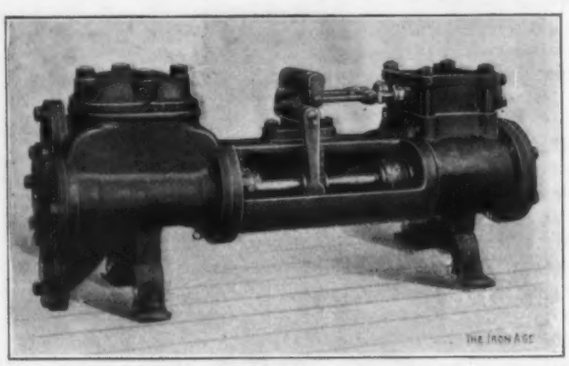


Fig. 26.—Worthington 6 x 4 x 6 Inch 1904 Model Duplex Boiler Feed Pump.

this type, Fig. 24, a light disk formed of hard rubber is placed in a comparament which may be approximately described as a hemisphere with a spherical segment taken out of the top. A slit cut in the disk upon one side fits over a vertical radial septum in the disk chamber, as shown in the cross sectional view, Fig. 25. The disk itself is conical in shape on both the upper and lower surfaces. From the center of the disk or piston a ball projects that forms a bearing upon which the piston revolves. This piston is wholly supported by this ball bearing, and being made of hard rubber, the specific gravity of which is about the same as that of water, does not cause any perceptible retardation of the flow through the meter. The piston ball, which fits closely within its recess, also carries the vertical spindle that drives the gear train. This vertical spindle projects through a circular opening in the disk chamber, and its upper end rests against a circular block or control, being thus constrained to move in a circle. It will be seen by examining the cut and considering the possible motion of the disk that there is never a free opening between the water inlet passage and the outlet, but that the disk is always interposed. The piston divides the interior case into four spaces, two of which are in communication with the inlet ports and two with the outlet ports. The inlet ports are on one side of the radial abutment and the outlet ports on the other side, and the continual filling and discharging of these four spaces gives the piston the motion of nutation, causing the spindle to travel in a circular path about the control. This, in turn, drives the gear train that connects with the counter, so that the full amount of water passing is correctly recorded. The motion of the vertical spindle is reduced by an intermediate train of four gears, which operates a slow moving spindle extending through a stuffing box in the top of the meter casing. This spindle, in turn, operates the gears moving the counter. This counter may be either of the round dial type or the straight reading type, and may be arranged to indicate in cubic feet, gallons, liters, &c., as required.

The Worthington Company also exhibits in this space its new 1904 model duplex boiler feed pump of the piston pattern, Fig. 26. This pump has been designed for a working pressure of 200 pounds, and the flanges and bolting are extra heavy. The gasket face on the force chamber cover and valve deck is exceptionally large, and the bolting is so distributed as to prevent gasket failure. The stuffing boxes are of the screw follower type.

Magnetite in Alabama

About three years ago F. and M. Sloss began investigation of a deposit of magnetic ore, located at or near Sycamore, Ala., on the Alabama Mineral division of the Louisville and Nashville railroad, in Talladega County, lying in the ridge about one-quarter of a mile from the railroad. This investigation, by sampling and analyzing the ores, and furnace tests, led finally to a sale of the property to the Shelby Iron Company, T. G. Bush of Birmingham, D. H. Gordon, R. H. Edmonds and William C. Seddon of Baltimore, C. Bradshaw of Birmingham retaining an interest, having been interested with the Messrs. Sloss. The new owners installed a complete plant as to mining machinery, crusher, tipples, houses, &c., and began development of the property. This has led to the opening up of a 6-foot seam of ore running about 2 miles, which has been shown by various analyses and thorough tests in the furnace to run between 46 and 47 per cent. metallic iron. The ore also carries 6 per cent. of carbonate of lime.

Underlying this seam, at a distance of only 4 feet, is another seam containing 9 feet of ore. It is leaner than the upper seam and may not be as profitable to work at this time. The location of this ore is advantageous for the furnace plants on the Alabama Mineral division, and the time may come when it can be transported to advantage to the Birmingham district. It is about 8 miles from Sylacauga, about 12 miles from Talladega, 25 miles from Ironaton and about 40 miles from Anniston. The extent of this property is about 1800 acres.

The New York, New Haven & Hartford Railroad has acquired control of the New London Street Railway Company, the Norwich Street Railway Company and the Montville Street Railway Company. These lines give the New Haven Company complete control of the line from Worcester, Mass., to New London, Conn., paralleling the tracks of their Norwich & Worcester division. A gap of 20 miles remains to be built, for which the company has the franchise, and it is presumed that the new line will be completed next season.

The Manufacturers' Charcoal Company has succeeded the American Charcoal Company at Bradford, Pa.

Tod Rolling Mill Engines.

Modern Engines Built by the William Tod Company, Youngstown, Ohio.

In spite of all the rapid strides which the steam turbine and gas engine have made, the common everyday steam engine has one field in which it is very likely to hold its own for a long time to come—namely, the rolling mill. The speed of rolling mill engines is limited by the maximum speed at which steel can be worked and by the minimum diameter of the rolls, which is determined by strength and rigidity. It is believed that the steam turbine will not be able to enter this field on account of its high rotative speed, and the gas engine is as yet not quite ready to comply with all of the demands and peculiarities of American rolling mill practice; it will, therefore, be of interest to study the design of some of the modern rolling mill engines which were recently built by the William Tod Company, Youngstown, Ohio, a firm which has furnished rolling mill engines for almost every part of the American continent.

A study of the drawings shows that all of these engines are equipped with piston valve steam distribution. The fact that the William Tod Company is also a builder of Corliss engines and has a very great number of cylinders with Corliss valve motion in operation would indicate that rolling mill managers in general prefer the slightly less economical piston valve steam distribution to the more economical "catch them and let them go" Corliss mechanism. The reason for this selection is easily found. Rolling mill engines are generally exposed to flying iron scale, dust, grit and smoke; a heavy layer of dust settles everywhere; all parts which are oily are soon covered with a thick and smeary mass, which wears out all joints with amazing rapidity. The fewer joints and the fewer external moving parts there are in the valve gear the better it is adapted for the rough usage of the rolling mill and in this respect the piston valve takes undoubtedly the first place. This statement is in no way contradictory to the recognized fact that the Corliss engine is preferable for sizes above 1500 to 2000 horse-power, provided that the engine can be located in a room which is separated from the mill proper.

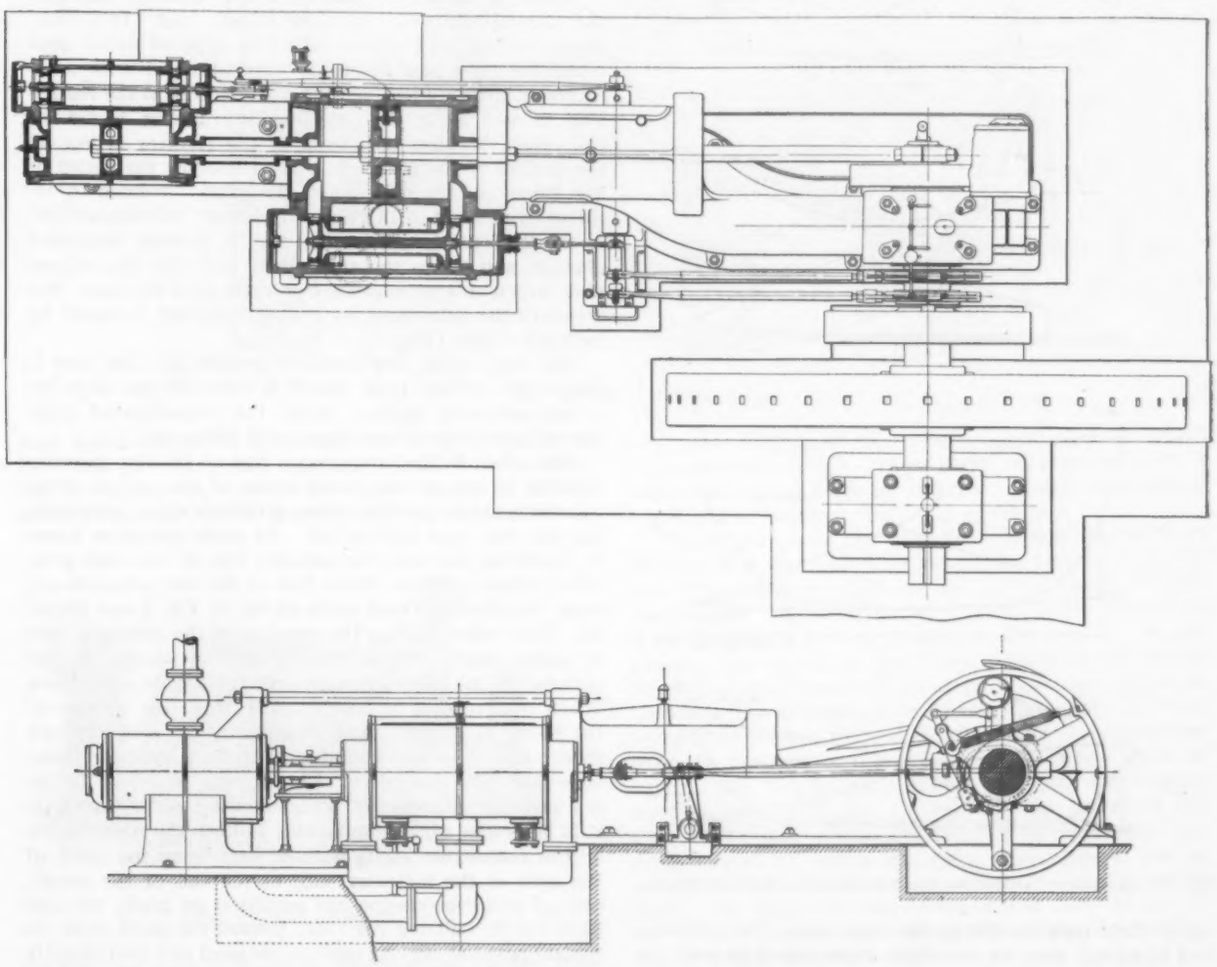


Fig. 1.—Plan and Elevation of the 18 and 32 x 36 Inch Engine.

We are pleased to present most of the important details on an 18 and 32 x 36 inch tandem compound engine, of which two are running in the mills of the Compania Fundidora de Fierro y Acero de Monterey, Monterey, Mexico; of a 24 and 44 x 48 inch tandem compound engine, of which several are running in various mills in Youngstown, Ohio, and of a 42 and 76 x 60 inch tandem compound engine, of which two are in operation in the Jones & Laughlin Steel Works in Pittsburgh. Following is a table of the principal dimensions of these engines:

Size engine. Inches.	Mean bearing, diameter and length. Inches.	Crank pin, diameter and length. Inches.	Cross head pin, diameter and length. Inches.	Piston rods. H. P. In.	Piston rods. L. P. In.	R. P. M.
18 & 32 x 36	13 x 26	8 x 6½	6 x 7	3½	5	100 to 120
24 & 44 x 48	18 x 36	10 x 9	8 x 10	4	8½	90 to 115
42 & 76 x 60	26 x 50	15 x 13	12½ x 14	6½	11½	58 to 100

There are some differences in the valve gears of the three engines, and a more complete description will be found in the latter part of this article.

Another feature which is common to all three engines is the transmission of the forces from the high pressure cylinder to the bed. It is effected by a tie rod which stretches between a horn or lug on the top of the bed plate and a similar lug on the crank end of the high pressure cylinder. This cylinder is also bolted to a sole plate which extends under the low pressure cylinder, for which it serves as a support, and is bolted to the bottom of the bed plate. This construction does not excel in beauty of appearance, but it affords the greatest possible freedom for heat expansion of the cylinders, and it insures at the same time an ideal accessibility to the low pressure pistons of tandem compound engines, which are nowadays the favorite type of rolling mill engines.

With a liberal cross section of tie rod and ample bearing surface of the sole plate on a good foundation, this construction leaves nothing to be desired in rigidity of working parts.

The 18 and 32 x 36 Inch Engine.

Returning to the smallest engine, it will be seen from Fig. 1 that both low pressure and high pressure pistons

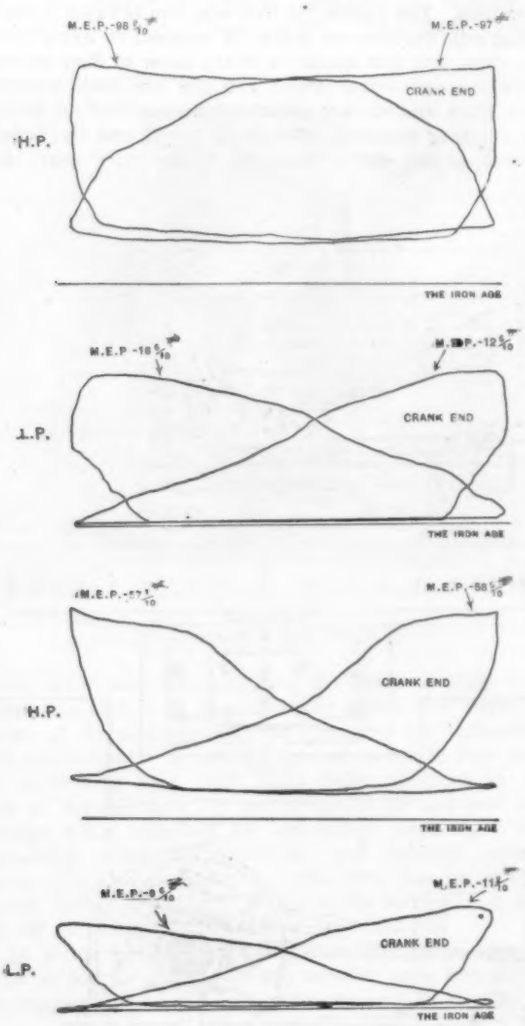


Fig. 2.—Indicator Cards from the 18 and 32 x 36 Inch Engine.

carry their own weight in the cylinders. The William Tod Company uses an overhung steam chest in order to obtain straight and direct steam passages. To get the cylinders close together, and to still insure perfect accessibility, the steam chests have been arranged on opposite sides. This arrangement requires the transmission of the motion through the bed plate, which is accomplished by means of a cross shaft. The high pressure valve gear alone is under control of the governor, the low pressure valve being driven by a fixed eccentric. The receiver pressure is therefore variable, being high at full load and low at friction load.

The high pressure valve is operated by a governor which swings an eccentric across the shaft, giving a small degree of compression at full load and a high degree of compression at no load. Fortunately, the high degree of compression at no load finds a low receiver pressure to compress, and the small degree of compression at full load finds a higher receiver pressure to start with. The variation in receiver pressure and the variation in compression pressure almost equalize each other, resulting in perfect smoothness of running at all loads.

Most rolling mill engines work with extreme and sudden fluctuations from no load to full load. If a compound rolling mill engine with the type of valve gear which we have just described were equipped with a receiver of large volume, serious disturbances in the regulation as well as in the quietness of running would be the result, because the steam in the receiver is beyond the control of the governor, and will follow the action of the same quickly only when the ratio "volume of receiver to moment of inertia of fly wheel" is comparatively small. This is always the case in tandem compound engines, and forms the theoretical basis for the success with which this arrangement of valve gear has met. The action of the valve gear, as above illustrated, is shown by indicator cards (Fig. 2).

The loop in the low pressure cylinder at light load is due to the cylinder ratio, which is decidedly too large for a noncondensing engine. After the contemplated addition of a condenser these loops will disappear.

The offset in the compression line on the low pressure cylinder is due to the construction of the piston valve. All single piston or slide valves give very small port openings for less than half cut off. To avoid excessive losses by throttling between the exhaust line of the high pressure cylinder and the steam line of the low pressure cylinder the double ported valve shown in Fig. 3 was adopted. This valve doubles the opening of the ordinary type of piston valve. When cutting off, the steam in the chamber in the valve expands until the double port closes. When compression is partly under way, the volume in the valve is brought into communication with the cylinder; steam is then compressed in both cylinder clearance and valve clearance. This is very beneficial in the low pressure cylinders of noncondensing engines, because it is otherwise almost impossible to keep the compression within reasonable limits without sacrificing too much of the area of the indicator card at the end of the stroke. Cut off and compression are equalized on crank end and head end by shifting the valve toward the shaft from its central position, and by making the head end port slightly wider on the exhaust side than the crank end port.

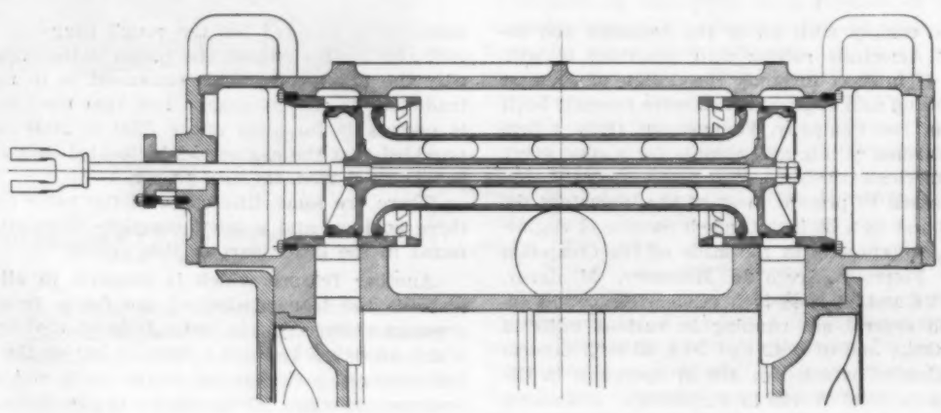


Fig. 3.—Double Ported Valve.

The governor, which is illustrated in Fig. 4, is of the single weight type. The gravity effect of the centrifugal weight is utilized to counterbalance the gravity effect of the eccentric and strap. Its action is based merely on

centrifugal force, and no attempt has been made to utilize tangential acceleration or inertia. A slight amount of inertia would be beneficial, but experience has proved that an excess of inertia (as it is found in some of the high speed inertia shaft governors) is detrimental for this class of rolling mill engines, because, with the sudden changes of load which are characteristic of rolling mill service, the inertia would throw the eccentric from the full load position to the no load position quicker than the steam in the receiver can follow, and would therefore give enormously high compression in the high pressure cylinder whenever the load is taken off suddenly.

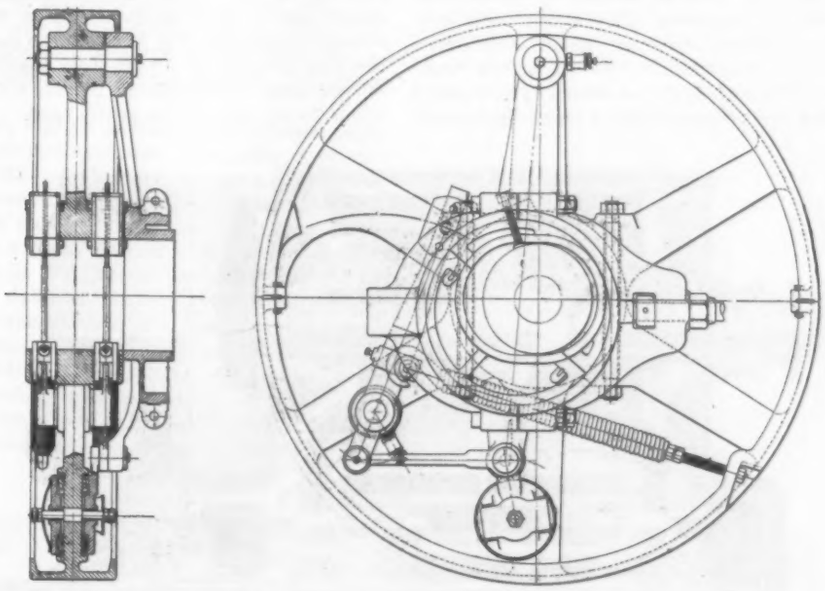


Fig. 4.—The Governor.

As an interesting departure from usual practice, it may be noted that the governor is equipped with a friction brake, instead of an oil dash pot. In shaft governors which are subjected to constant shaking, due to the reaction of the valve gear, adjustable friction brakes come very close to the action of oil gags and have the indisputable advantage that no oil can leak out. Every practical engineer around a rolling mill knows that the leakage of oil dash pots in shaft governors is one of the most unpleasant and seemingly unavoidable troubles of usual practice. The friction brake as built by the William Tod Company consists of two large wood lined disks which hang between springs. These disks are surrounded by a high ridge, which keeps oil and dust out and thus insures a practically constant coefficient of friction.

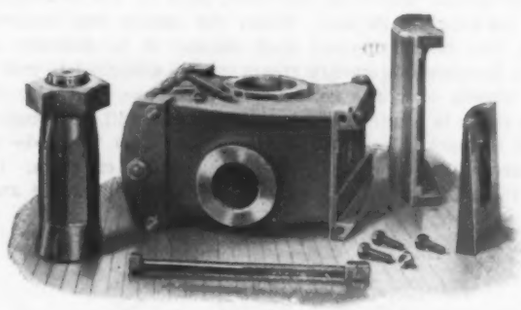


Fig. 5.—The Cross Head.

Fig. 5 illustrates the cross head of this engine. The William Tod Company was among the first to adopt the use of an independent wedge and of shoes with overlapping flanges. The advantages of this construction, which is now becoming general throughout the country, are apparent. The inertia of the shoes is taken up by flanges which overlap the main body of the cross head, while at the same time the shoes may be removed by sliding them around the wedges without disconnecting the connecting rod. An accident to the adjusting bolt is not likely to happen, but, if it happens, it does not cause any further trouble; while with the old construction, in which the shoe formed the wedge, the friction between shoe and guide tended to wedge the guide barrel apart, and is known to have caused serious wrecks. Other standard details are similar to the corresponding parts of the 24 and 44 x 48 inch tandem compound engine, the description of which follows.

The 24 and 44 x 48 Inch Engine.

This engine stands not exactly in a separate room, but in a side aisle at some distance from the mill. A greater number of moving joints was, therefore, not objectionable in this case, and piston valves with internal cut off valves were used for the steam distribution. The general appearance of the engine is well represented by Fig. 6, with the exception that a large, well drained oil pan extends under the governor and eccentrics, which oil pan is not shown in the cut. A section through the low pressure cylinder and valves is given in Fig. 7. It

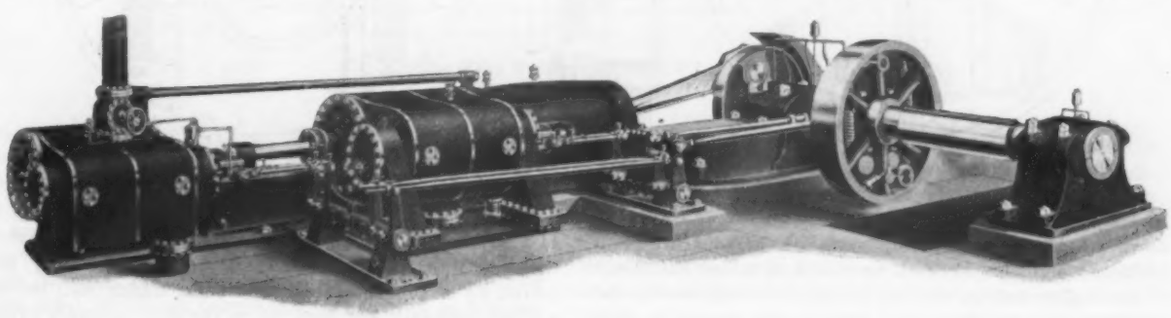


Fig. 6.—The 24 and 44 x 48 Engine.

will be noticed that the cut off valve is double ported on the main valve and that sharp cut off is obtained with comparatively small relative travels of cut off valve and main valve. Narrow packing rings are employed and uniform wear of packing rings is insured by spiral ribs both in main valve and bushing. The steam ports are straight and direct, which, of course, means also overhanging steam chests. The main valves are driven from a fixed eccentric, while both high pressure and low pressure cut off valves are controlled by a shaft governor.

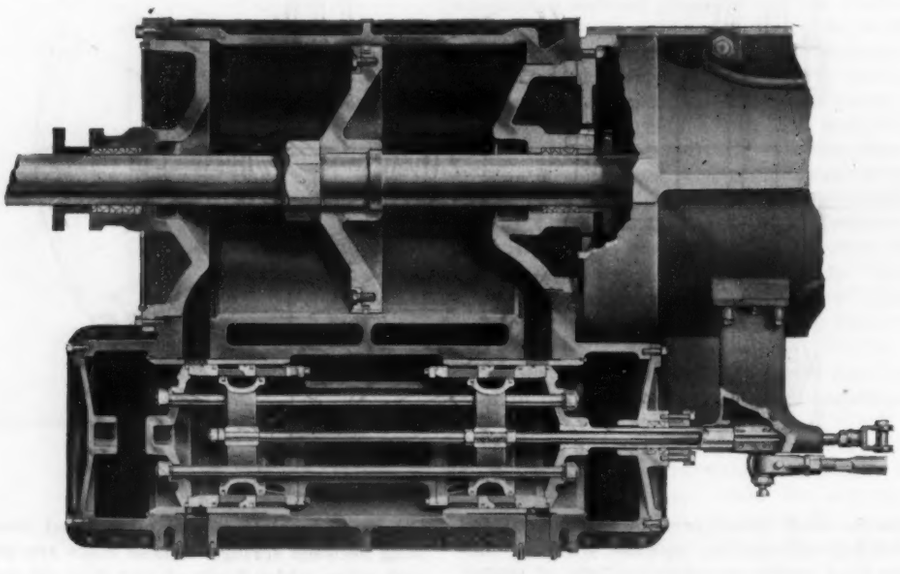


Fig. 7.—Section through the Low Pressure Cylinder and Valves.

The shaft governor, the design of which is covered by United States patent 761,019, is shown in Fig. 8. It is distinctly novel and stands in a class by itself. It consists of an eccentric and a counterweight provided with lugs, between which coiled springs are stretched. For the greatest speed of engine no separate centrifugal weights are employed, the centrifugal force of eccentric, strap and counterweight being sufficiently powerful to regulate the engine closely. In order to slow the engine down, when rolling heavier material, a separate centrifugal weight is provided, by means of which the speed of the engine may be reduced 25 per cent. Eccentric and counterweight are suspended from double cranks in such a way that the center of the cut off eccentric is swung around the center of the main eccentric. This arrangement results in practically constant relative travel between main and cut off valves and consequently in uniform sharpness of cut off for all loads.

There exist a number of similar gears which regulate either by changing the lap of the cut off valve or by swinging the cut off eccentric around the shaft. In all these valve gears the cut off is by practical reasons limited to 65 to 70 per cent. in the valve gear, which corresponds to 55 to 60 per cent. in the steam card at 800 feet per minute piston speed. As most rolling mill engines are subject to extreme fluctuations of load, a longer steam admission is desired, and in this respect the bi-eccentric governor, Fig. 8, offers the decided advantage of allowing a range of cut off from absolutely zero to about 80 per cent. of the piston travel, which corresponds to about 70 per cent. in the steam card.

Particular attention has been paid to the detaching and backing up device. When the engine has stopped with the piston beyond half stroke it is difficult to start, because not enough steam can be admitted to carry the wheels over the center. In this case, and also in case there is a sticker or a collar in the mill, the engine must be backed up and arrangements must be made to accomplish this quickly and without undue exertion. In the 18 and 32 x 36 inch engine, as well as in the 24 and 44 x 48 inch engine, the valves are moved by hand power, whereas in the 46 and 72 x 60 inch engine they are moved by a separate steam cylinder, which will be described later on. For backing up the high pressure cylinder alone is used, the low pressure cylinder being thrown out of action by a quick acting by-pass valve, which connects the receiver (that is, the low pressure steam space) with the low pressure exhaust. The engine is thereby converted into a single cylinder high pressure engine. From Fig. 7 it is evident that the cut off valve is open on the main valve in midposition. If, therefore, the cut off valve and main valve be locked in midposition and

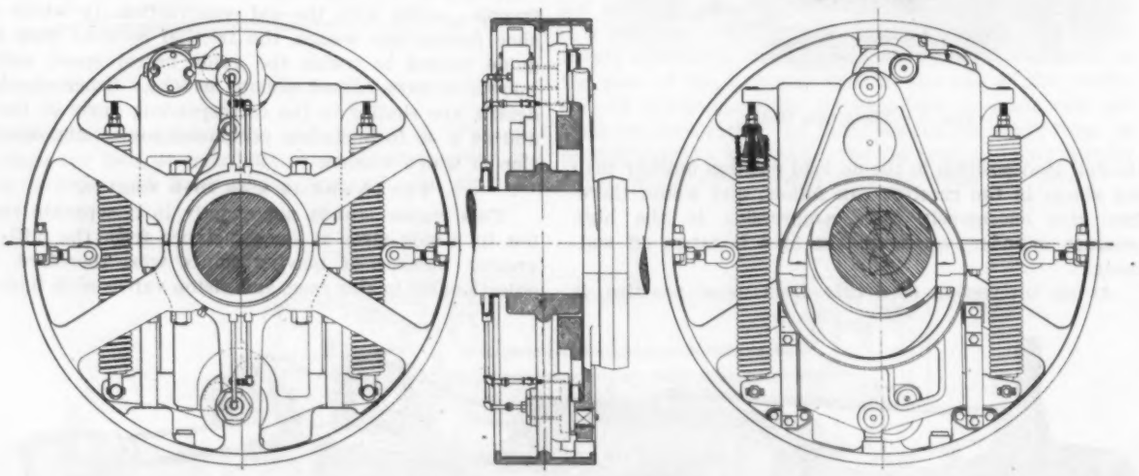


Fig. 8.—The Shaft Governor.

moved together, they will act as one single valve. To this end holes have been provided in the main rocker, Fig. 9, and in the cut off rock shaft in such a way that the starting bar, when inserted, locks both valves in mid-position ready for operation. The detaching device is shown in Fig. 10. It is self explanatory and calls for no comment, but it may be mentioned that no lifting of rods or weights is necessary with this construction, which is a decided improvement over the majority of unhooking devices.

The outside view, Fig. 6, shows a slide between high pressure and low pressure cylinders. This slide supports one-half of the weight of the low pressure piston, the other half being carried by the main cross head. The low pressure piston rod is made heavy enough to support the piston with a very small deflection.

The construction of the piston is clearly shown in the section through the cylinder, Fig. 7. It is made of cast steel, as light as is consistent with strength and rigidity. One sectional packing ring is employed with leaf springs to hold it out against the cylinder walls. The follower stud nuts are secured by split pins.

Figs. 11 and 12 are outside views of the bed plate end, showing the arrangements for oiling and for catching

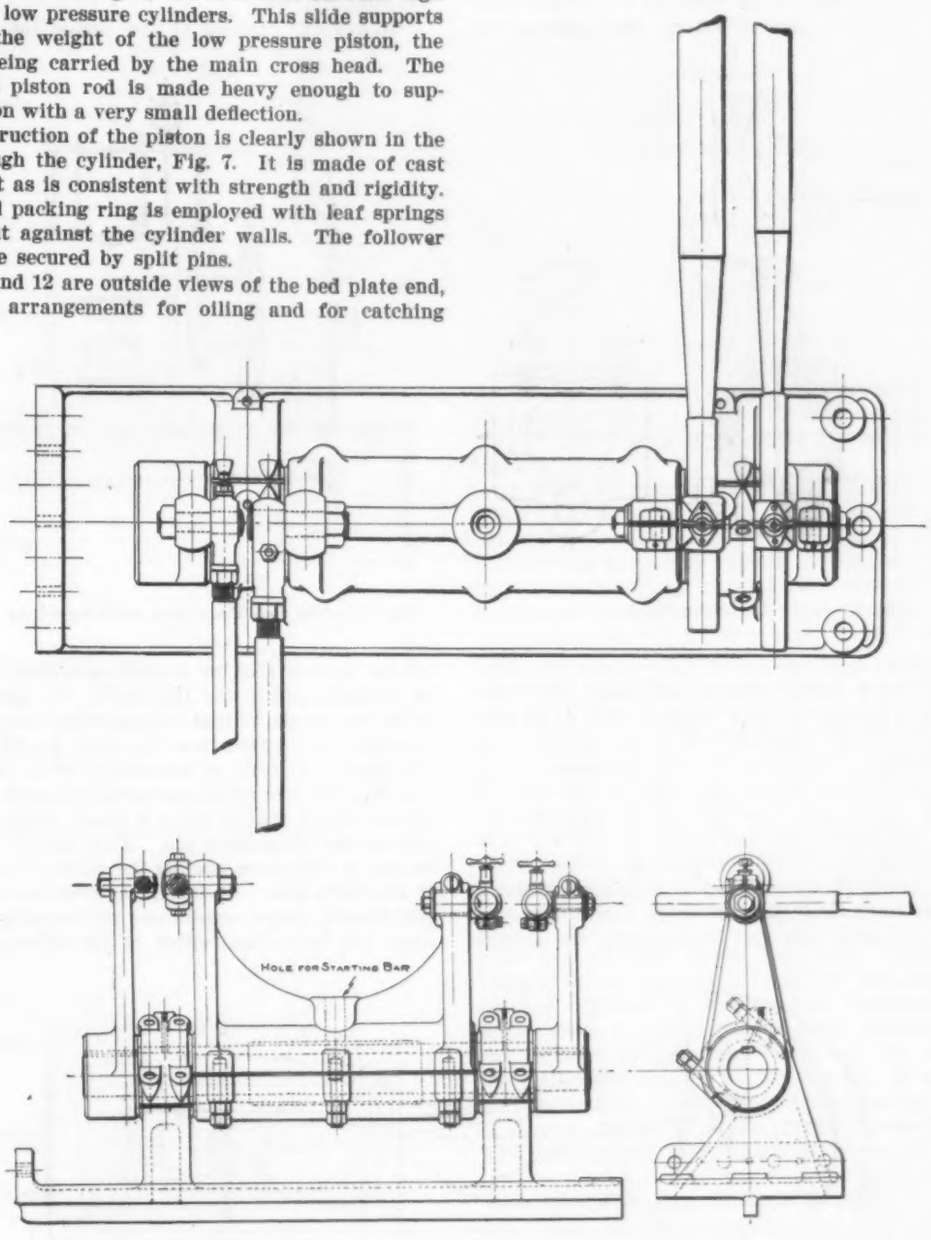


Fig. 9.—The Main Rocker and Cut Off Rock Shaft.

waste oil. The builders recognize that chances for trouble from heating and wear are the smaller the more complete and accessible the oiling arrangements are. Accordingly, steps have been provided which lead up to the main bearing cap, Fig. 11. A large conveniently located handhole gives access for feeling the temperature of the bearing. This hole is covered by a light cap and is not used for oiling purposes. Lubrication is effected by a central oil tank leading into the bearing and into the eccentrics. The crank pin is oiled by a centrifugal oiler, Fig. 12. Cross head pin and guides are lubricated by sight feed drip cups.

One of the gravest sins committed on the majority of American rolling mill engines is the waste of oil. This waste of material is objectionable, not only on account of the expense, but much more so on account of the action of oil on cement, as solid engine foundations are gradually softened and corroded by the continuous process of oil soaking through the cement, and bed plates are loosened on their foundations and begin to rock. The results are serious enough to justify equipping all moving parts of the engine with oil guards and drip pans. The proper time for providing for these oil catching devices is the time when the engine is still in the drawing room. Fig. 12 shows that in the engine under consideration the oil pans have an organic connection with the engine, being part of the bed plate, both in the crank pit and alongside of the cross head guides. A wide oil guard protects the crank and connecting rod. A large drip pan extends under governor wheel and eccentrics, Fig. 11, and oil troughs are formed by the sole plates of all rockers, Fig. 6.

Fig. 13 shows indicator cards of this engine, which certainly speak well for the valve gear, considering the fact that they were taken at 900 feet per minute piston speed.

The 42 and 76 x 60 Inch Engine.

Turning to the largest of the three engines, the 42 and 76 x 60 inch tandem compound engine, a glance at the general drawing, Fig. 14, shows that it is in many respects similar to the smaller units. One of the most notable differences is the type of bed. It is of the flat guide, or Porter Hamilton, type. In fact, these engines were built at a time when the William Tod Company

had not yet taken up the building of bored guide beds. As already stated, two of these engines were built for the Jones & Laughlin Steel Works, in Pittsburgh. One drives a 40-inch three-high blooming mill at 58 revolutions per minute, and the other drives a 28-inch three-high mill at 75 revolutions per minute. The fly wheel of the slow engine is 28 feet in diameter and weighs 160,000 pounds; the wheel of the fast engine is 21 feet in diameter and weighs 120,000 pounds.

Although these engines are built on lines similar to the smaller engines, their large sizes called for several departures. Among them is the splitting of the low pressure valves into two sets of valves. The general arrangement shows only one set of these valves, the other set being vertically below. This arrangement, which has been used on a number of large engines, does away with piston valves of large diameter, which are objectionable for several reasons—for instance, large clearance volume and the large surface which they offer to the exhaust steam. The valves have one opening for exhaust, two for steam. The total number of valves for the low pressure cylinder is eight, with 16 packing rings. These figures may create the impression of complication, but it must not be overlooked that all these valves move together like one valve, and that consequently the number of moving joints is reduced to a minimum. Adjustments are limited and take time, but after the valves are once right the engine is absolutely fool proof and dirt proof.

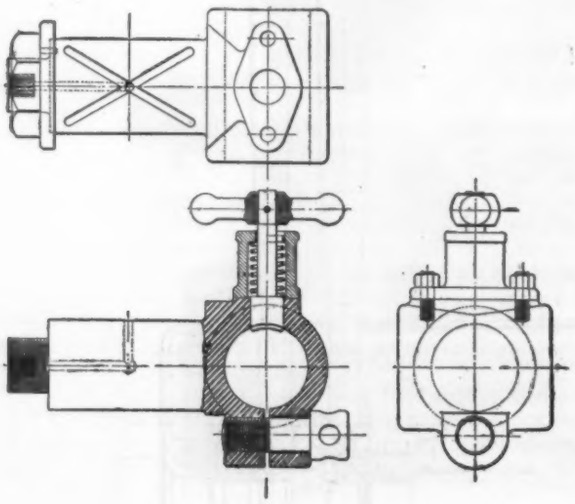


Fig. 10.—The Detaching Device.

On account of the large size of the high pressure valves backing up by hand power would be very hard on the operator; for this reason a steam operating gear has been provided, Fig. 15.

The high pressure valve stem is carried out at the rear of the steam chest. It moves in the hollow piston rod of the auxiliary steam cylinder. By means of a locking device similar to the one shown in Fig. 10 the two stems can be doweled and clamped together. After disconnecting the rocker end of the eccentric rod, the operator can move the valves by simply admitting steam alternately on the two sides of the auxiliary piston. The levers for operating the auxiliary steam valve are carried over close to the main throttle valve so that the operator can see the position of the crank when throwing his valve lever. Smoothness of operation and freedom from shocks are attained by independent steam and exhaust ports in the auxiliary cylinder and by a chocking valve at the exhaust of this cylinder. Special attention has been paid to making this valve moving device fool proof. The auxiliary cylinder and its connection look like a formidable affair when seen by themselves, but they appear small when attached to the engine. (Compare general drawing, Fig. 14.)

In regular running of the engine the high pressure valves are operated by a shaft governor, which swings an eccentric pin across the shaft. The general drawing of the engine shows that this governor rests in a separate bearing and is driven from the crank pin by a drag crank. The governor itself is reproduced to a larger scale in Fig. 16. The arm which moves the eccentric pin is shaped in such a way that it forms a heavy weight on the other side of the suspension pin. This weight furnishes the necessary resistance against the reactions from the mass of the valve gear; its inertia acts in the right direction and thereby helps regulation; its centrifugal effect balances the centrifugal effect of the valve gear reaction.

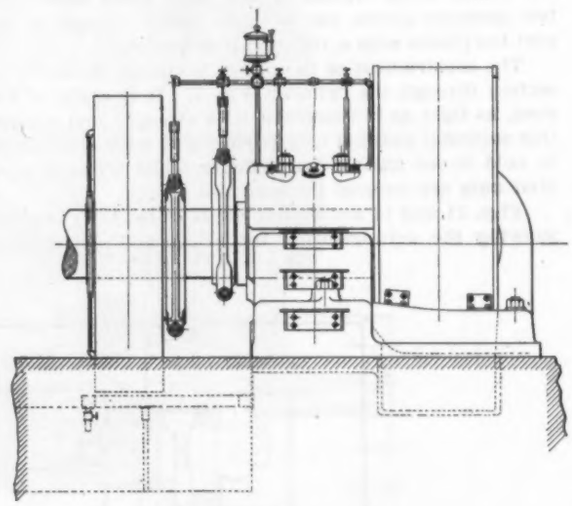


Fig. 11.—The Bed Plate End, Showing Oiling Arrangement.

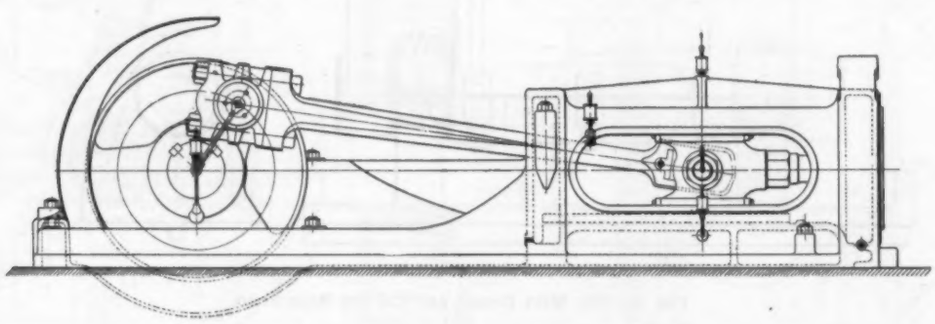


Fig. 12.—Side of Bed Plate, Showing Oiling Arrangement.

A centrifugal weight has been so located and connected to the inertia weight that its gravity balances the same in all positions. The centrifugal force of the centrifugal weight is counteracted by a powerful leaf spring. Provisions for the attachment of an oil dash pot were made, but the governor worked so well without the oil pot that it was never put on. Adjustment in wide limits is obtained by liners of large size.

The engine is very accessible in all parts. Steps and railings have been provided to make the main bearing and cross head gnides accessible. The oiling arrangement is very complete. As an additional precaution the main bearing and the outboard bearing have been water jacketed.

In reviewing the arrangements and details of the de-

scribed engines it will be observed that they do not excel by a variety of ingenious devices, but rather by simplicity and strength, which form the necessary foundation for the reliability required in rolling mill service.

Panama Canal Contracts.

WASHINGTON, D. C., July 22, 1904.—The announcement of the permanent organization of the Panama Canal Commission has been followed by numerous applications to the headquarters in this city of manufacturers and dealers in machinery, tools and supplies of all kinds who desire to furnish these articles for use in the construc-

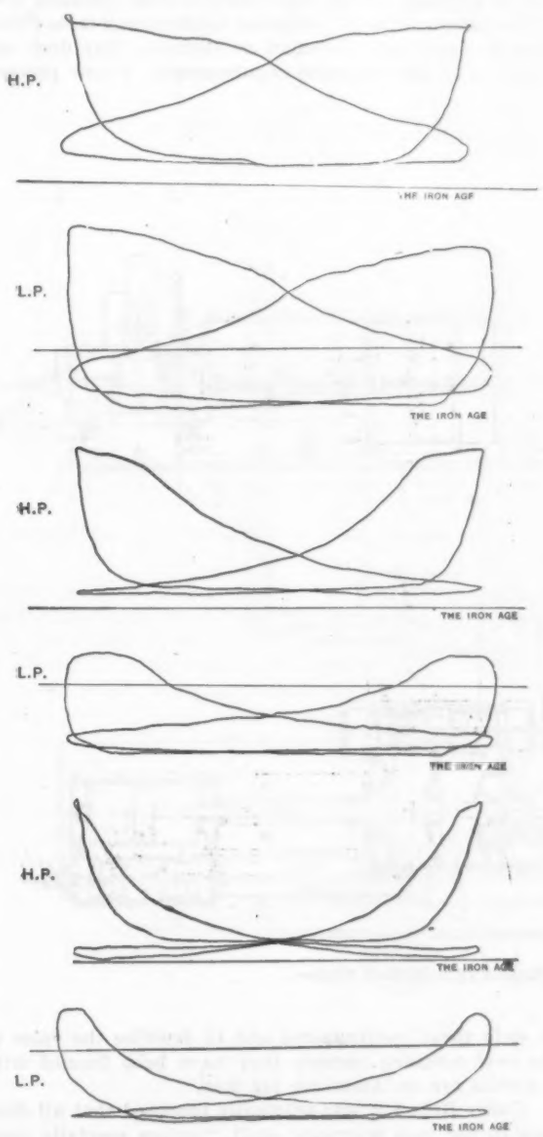


Fig. 13.—Indicator Cards from the 22 and 44 x 48 Inch Engine.

tion of the canal and wish to know the terms and conditions of contracts therefor. From the secretary of the commission, D. I. Murphy, the correspondent of *The Iron Age* has secured a general statement covering these points which will doubtless be of interest to all concerned.

It should be said at the outset that the commission is not now prepared to make any considerable purchases and will probably not be ready to let contracts of any magnitude within the next six months. The first and most important question to which the commissioners will address themselves is the method to be employed in the construction of the canal—that is to say, whether the Government will build all or any part of the canal by day's labor, or will let the entire undertaking by contract in sections. To determine this question Commissioners Walker, Burr, Grunsky and Harrod to-day sailed for the Isthmus from New York. At Panama they will be joined by General Davis, the Civil Governor of the canal zone, and by Commissioner Hecker, and two months will be spent in going over the project very carefully to settle the method of construction to be employed.

Upon the return of the commissioners to Washington in September the work of construction will be laid out in detail, and the engineers and draftsmen will proceed at once to prepare drawings and specifications. In the meantime Commissioner Hecker will complete an elaborate task to which he was assigned some time ago—namely, the making of a detailed inventory of all the machinery, tools, implements and material of all kinds taken over from the French company. The original schedules furnished by the company show the enormous total of $29,000,000 as the first cost of all the articles listed. A preliminary report from the commissioner indicates that probably $2,000,000 worth of machinery, tools, &c., including dredges, steam shovels, locomotives, pumps, &c., will be found to be in serviceable condition.

It is improbable that the Government will begin the actual construction of the canal before July 1 next. In the meantime, however, about 1000 Jamaican negroes, formerly employed by the French company on the Culebra cut, will be kept at work under the supervision of the commission's engineers now on the ground. The work being done by this force is merely that of excavation, for which an ample supply of tools and machinery is now on hand. As soon as it has been determined what part of the tools, supplies, &c., can be utilized by the commission, the remainder will be gathered together and sold as junk to the highest bidder.

While no new work upon the canal will be undertaken within the coming 12 months, a very important project—namely, the sanitation of the canal zone, will be begun at once and pushed as rapidly as possible, and for this work large quantities of supplies of certain kinds will be purchased at an early date. The principal features of this project are the rehabilitation of the 2000 buildings, including residences, offices, hospitals, warehouses, &c., purchased from the French company, a systematic cleaning up of the towns and villages in the zone, and the furnishing of an adequate water supply throughout the entire length of the canal. The plans for an adequate water supply will involve the installation of several separate systems, and it is expected that a very large amount of iron pipe will be employed in this work.

The commission will ultimately organize a Bureau of Contracts and Supplies, but in the meantime a temporary appointment as purchasing agent has been given to E. A. Drake, vice-president of the Panama Railroad, whose office is at 24 State street, New York. There will be no change, for the present at least, in the method of purchasing supplies for the Panama Railroad, which, together with a subsidiary steamship company owned by the railroad company, has come into the possession of the United States with the canal strip. It is understood that the railroad will continue under the superintendency of Colonel Shaler, a retired United States Army officer, who has managed the property for a number of years.

The application of the Dingley tariff to the canal zone will insure the purchase in the United States of practically all the machinery and supplies needed for construction purposes, as well as for the maintenance of the working force. The average duty on such material is about 45 per cent. ad valorem, and except in rare instances, the commission will not find it profitable or desirable to purchase anything abroad. Everything bought in the United States will be eligible to free entry into the canal zone, whether of American manufacture or not, the tariff relations between the zone and the United States being identical with those existing between the several States. Two custom houses have already been opened under Governor Davis' instructions, one at Cristobal, near Colon, and the other at Ancon, near Panama. These are both seaports, and goods from the United States intended for the zone will be entered at these custom houses and passed free of duty, while foreign goods will pay the Dingley rates. W. L. C.

Benjamin T. Leuzarder, one of the organizers of the Holthoff Machinery Company, Cudahy, Wis., which was

recently purchased by the Power & Mining Company, and secretary and treasurer of the Milwaukee branch of that company, has resigned his position and will devote himself to other lines of business. Mr. Leuzarder will be succeeded by L. B. Budd, former auditor of the company.

A New Departure in Scotch Warrants.

GLASGOW, July 15, 1904.—The proposal to form a pig iron warrant market in New York has been noted here, and the development is being awaited with great interest. Glasgow, as is well-known, is the great center of the iron warrant trade, although the amount of iron actually stored here is now insignificant, and transactions are at present confined to Cleveland warrants, which is to say to iron stored in Middlesbrough. A project has just been laid before and accepted by the Scotch Pig Iron Trade Association, which may not only have marked effect on our market, but also on the American market. It is, in brief, to introduce a new form of warrant for standard foundry pig iron so as to cover American iron.

The Scotch warrant, as it has always existed, is for 500 tons of pig iron of accepted brands, consisting of three-fifths of No. 1 iron and two-fifths of No. 3 iron. A warrant is not necessarily all for one specific brand. It is an acknowledgment by Connal & Co., the store keepers, of the receipt of, and an obligation to deliver on demand, 500 tons of iron which may be of many brands, but always in such proportions that 300 tons of the whole shall be of No. 1 quality and 200 tons of No. 3 quality, of "good merchantable brands" (G. M. B.). A warrant was recently created for Scotch No. 3 iron alone—that is to say, for 500 tons all No. 3; but, although these warrants are quotable in the market, there is no speculation and little dealing in them. The Cleveland warrant is for 500 tons all No. 3 quality, approved brands, of Cleveland ordinary iron. The Cumberland warrant is for "mixed numbers" of Cumberland hematite iron—that is, Nos. 1, 2 and 3 qualities in equal proportions. At times there have been over 1,250,000 tons of Scotch G. M. B. in the Glasgow stores, all under warrant, but at present there are only 9500 tons; in Connal's Middlesbrough stores there are now only 78,000 tons of ordinary Cleveland iron, and in the Cumberland stores there are 14,300 tons of hematite iron. There is accepted a fifth form of warrant for "mixed numbers" of Middlesbrough hematite, but for a long time there has not been enough of this iron in store to make a deal.

The New Contract

which has been adopted by the Pig Iron Trade Association is for "standard foundry pig iron," and is not designed to interfere in any way with existing contracts and warrants. It is described as an additional contract under which all classes of iron, foreign as well as British, but excluding hematite, can be dealt in, provided they come up to the standard for foundry pig iron. Before being admitted to warrant privileges, analytical tests will be applied and the experience of iron founders also will be noted. It is not proposed to admit any iron, either British, American, Canadian or German, that does not comply with the requisite requirements. I now proceed to state these requirements and to describe the rules of the new contract, because they have been framed with a special eye on American pig iron.

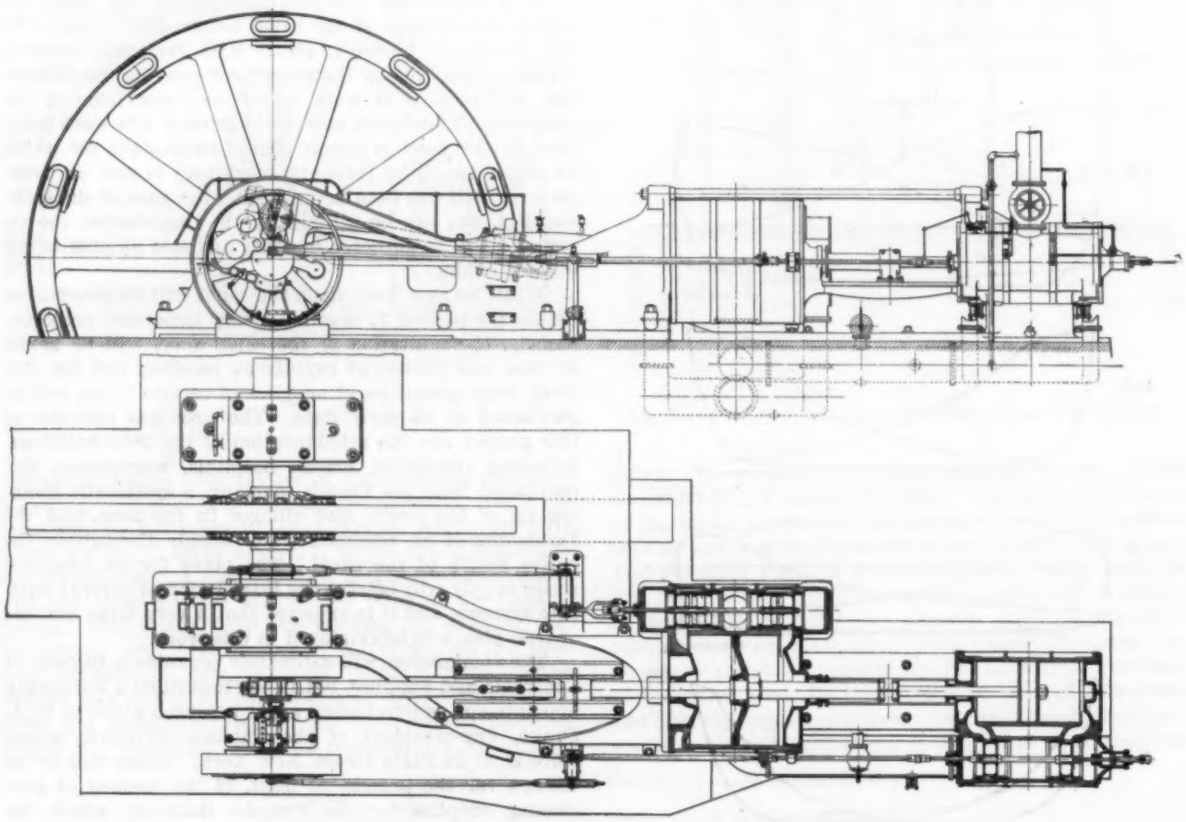
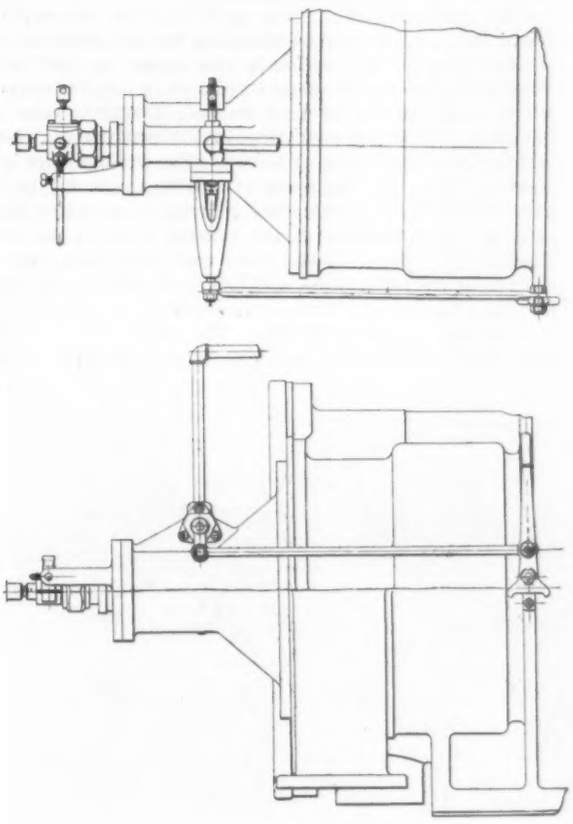


Fig. 14.—Elevation and Plan of the 42 and 76 x 60 Inch Engine.

Under Rule I it was originally proposed that all dealings in pig iron warrants shall, "unless specially mentioned to the contrary at time of purchase and sale," be in standard foundry pig iron; that the metal tendered shall be of makes on the list approved by the committee or shall comply with the standard analyses fixed by the committee. As adopted, however, the declaration must be made at the time of purchase and sale, whether the deal is in Scotch, Cleveland or standard foundry warrants. The basis of dealings for the latter is No. 3 Middlesbrough (Cleveland) warrants, of the following brands: Redcar, Coatham, Lackenby, Linthorpe, Cleveland, Claylane, Cargo Fleet, Normanby, Ormesby, G. W. L., Teesside, Acklam, Ayresome, Newport, Clarence, Skinningrove, W. W. & Co. and Tees-Bridge. A seller of standard foundry iron is to have the option to deliver, on maturity of sale, warrants either (1) for No. 4 Cleveland foundry iron of one of the makes above named, at a rebate of 1 shilling per ton; or (2) No. 3 Scotch pig iron of one of the makes named below at a premium of 4 shillings per ton; or (3) No. 1 G. M. B. Scotch pig iron of the same makes, at a premium of 6 shillings per ton; or

(4) Scotch mixed numbers, three fifths No. 1 and two-fifths No. 3 (*i.e.*, Scotch warrant iron) at a premium of 5 shillings 3 pence per ton; or (5) "Any other iron conforming to the standard analyses of the committee." The Scotch makes, which may be tendered under this contract, as mentioned above, are Coltness, Gartsherrie, Summerlee, Shotts, Calder, Dalmellington, Eglinton, Glengarnock, Clyde, Carnbroe, Wishaw, Govan, Quarter, Monkland and Carron.



The standard analyses proposed for other irons were as under:

	Silicon. Per cent.	Phosphorus. Per cent.	Sulphur. Per cent.
No. 1	2½ to 3½	Not exceeding 1.65	Not exceeding 0.04
No. 2	2½ to 3½	Not exceeding 1.65	Not exceeding 0.05
No. 3	1 to 3½	Not exceeding 1.65	Not exceeding 0.08
No. 4	1 to 3	Not exceeding 1.68	Not exceeding 0.10

But the silicon figures have been objected to for pipe founding, and the committee is revising them so that a higher minimum shall be fixed. The premiums and rebates on these qualities, as compared with Middlesbrough No. 3, are to be as under, the character / used indicating shillings:

	At Liverpool and Ellesmere port.	At Manchester.	At Frodingham.	Middlesbrough.	At Glasgow.
No. 1	+ 4/	+ 6/	— 1/ rebate	+ 2/	+ 6/
No. 2	+ 2/	+ 4/	— 1/ rebate	basis	+ 4/
No. 3	+ 2/	+ 4/	— 2/ rebate	basis	+ 4/
No. 4	+ 1/	+ 3/	— 3/ rebate	1/ rebate	+ 3/

Under option 5 it is laid down that "each 500-ton parcel must be sampled under supervision of one of the recognized analysts by drilling ten pigs in every 100 tons half way through, at the side of the pig, and about 6 inches from the end. Three samples shall be taken from the drillings, and one sent to each of two recognized analysts; and if they be unable to agree, the third sample shall be sent to a third recognized analyst, chosen by the other two, who shall determine the produce, and whose report shall be final and binding. They shall give a certificate stating that the sampling has been done as prescribed, and specifying the agreed contents of silicon, phosphorus and sulphur, and their certificate shall further state whether the iron is No. 1, 2, 3 or 4 grade, according to the standard analyses. All charges for sampling, analyzing, warehousing and free delivery shall be paid by the seller."

Other rules provide that there shall be no allowance for discount or draft; that the warrants tendered shall be those of a recognized store, and if more than one warrant be tendered for each parcel of 500 tons they shall be for iron deliverable from the same store and of the same grade, except as provided for under Rule 1; that all warrants shall entitle the holder to receive delivery free on board or free on rails at the place mentioned in his option; that buyers shall be allowed the usual transfer fee for each warrant, except when by agreement with sellers the warrant has been put in a special name or names.

This, then, is the substance of the contract form adopted for the creation of the new class of warrants. It is, however, subject to amendment (as stated) with regard to the silicon analysis, and also to revision with regard to the differences in prices under the option. The objection to the scale given above is that the proportions of price between Nos. 1, 3 and 4 are not constant, but vary frequently in the market, as do also the differences between Scotch and Cleveland iron. It is probable that something like a sliding scale will be adopted, otherwise the fixed scale would seem well adapted to encourage "corners."

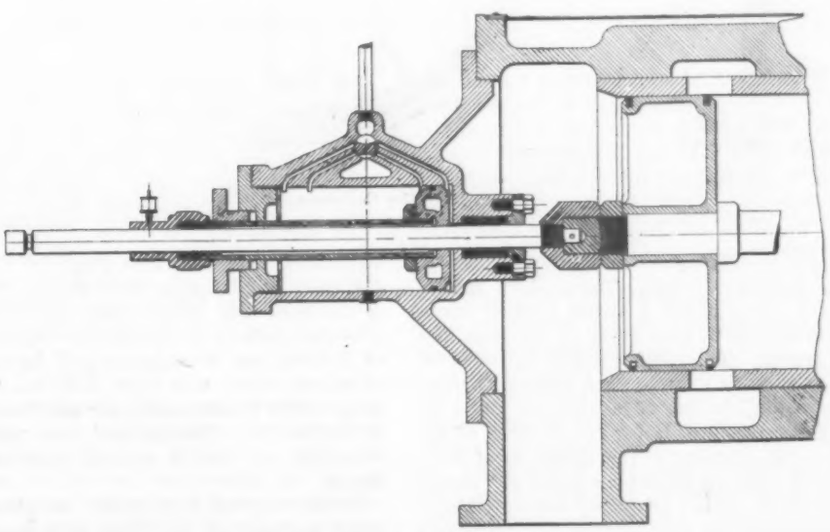


Fig. 15.—Arrangement of Steam Operating Gear.

A Market to Be Created for American and Other Non-British Iron.

Two things, it will be seen, will result from this contract if it proves effective. One is that a large speculative and investing market will be created here for American and other non-British iron, in competition with Scotch and English warrant iron. The other is that warrant stores will have to be created and recognized

elsewhere than in Glasgow and Middlesbrough. It will never do, of course, to bring American or Canadian iron to Glasgow merely in order to get warrants for it. What is designed is to have all imported iron stored at the port of arrival most convenient for the largest area of consumption. Therefore, the warrants of the Manchester Canal Company, some Liverpool dock, or warehouse or railway company, and so on, will be recognized as negotiable securities, just as are Connal's Glasgow and Middlesbrough warrants. Wherever there is no storekeeper whom the committee will recognize, Connal & Co. will doubtless establish a yard if necessary. The point is that neither Glasgow nor Middlesbrough will be the sole receiver of pig iron stocks. The Glasgow stores have become depleted of G. M. B., partly because the Scotch smelters now make more hematite iron for the local steel makers, and consequently a smaller quantity of foundry iron, but also because of the expense of bringing pig iron by rail from the furnaces in Ayrshire and Lanarkshire merely to put into store, with the subsequent expense of rail or water conveyance to the place of consumption or shipment. In the old days, when prices were high and competition small, this did not matter and Connal's warrant stores had always a large standing stock, whatever the fluctuations of trade. The modern idea is to have a warrant store, under a sworn neutral storekeeper, at or approximate to each group of furnaces, not in one common center. This idea applied to imported iron will involve a warrant store at each important point of arrival. The establishment of a warrant store at Frodingham, in Leicestershire, is for convenience of access to the consuming markets of the Midlands of England. The option of delivery there by a seller of "standard foundry" warrants would obviously not suit North of England or Scotch buyers, however much it migh suit "bear" sellers, in whose interest, indeed, the new contract seems framed.

B. T.

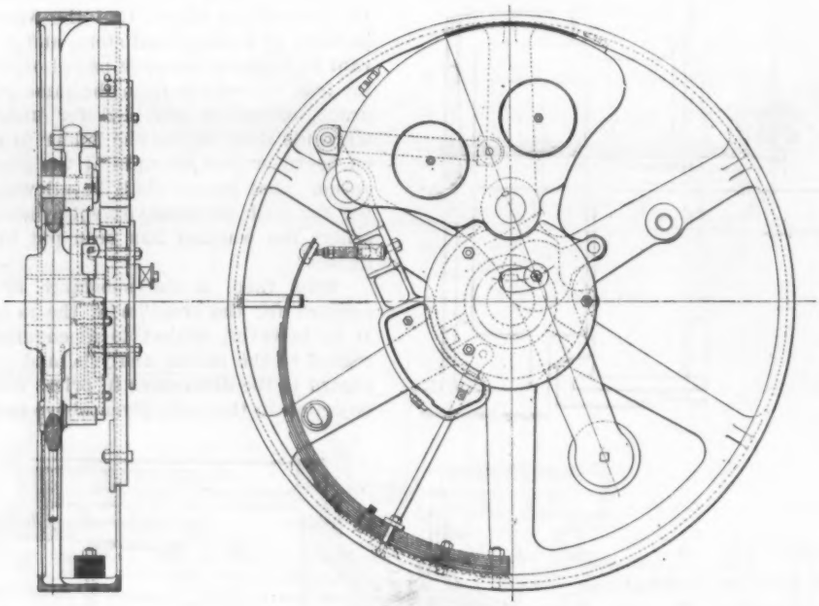


Fig. 16.—The Governor.

The importance of the telephone as a customer of manufacturing industries is shown in the report of the Manufacturers' Bureau of the Census. The figures given, for the year ending December 31, 1902, are a little old. The year 1903 will show far larger figures when they are obtained. But those in hand are large enough. There were 4,350,486 miles of single telephone wire in the United States and 2,315,297 telephone instruments. The inconceivable figure of 5,070,000,000 messages were spoken over these wires in 1902, including 120,000,000 long distance calls. The gross revenue was $86,800,000, the operating expenses were nearly $62,000,000, and the net income, after deducting bond charges, was more than $22,000,000. It may easily be reckoned that a good many of these millions of dollars went to manufacturers of wire, electric specialties and a thousand and one other products of American mills and factories, mostly in metal lines.

The Pacific Coast Outlook.

SAN FRANCISCO, Cal., July 19, 1904.—The crop reports up to date are not as encouraging as they were at an earlier period. The estimate now made by Secretary Friedlander of the Produce Exchange is 400,000 tons of wheat and 600,000 tons of barley; 1,000,000 tons altogether. This is a reduction in the product of wheat and an increase in that of barley. The probabilities are, however, altogether in favor of a larger outcome in regard to wheat. The estimate for barley is doubtless large enough. The weather at the present time is the best possible for crops. It has been cool with fogs, and as the wheat harvest is late, the first new wheat only coming along this week, there is room still for a reconsideration of the wheat estimates. The shipments of fresh fruit from Sacramento and one or two interior points have been less than last year for the same time, but the fruit crop is also later than it was in 1903. This is the dark side of the crop reports to date, but it applies particularly to California. The two Northern States of Oregon and Washington will have tremendous crops of wheat, which will fully make up, as far as the coast as a whole is concerned, for anything like a falling off in California. Having said this much, it will not be wondered at that a general complaint of dullness is heard.

What may be lost by any drawbacks in the agricultural sections of the State will be made up fully by the improvement in the districts in which lumber and oil are the leading industries. A good deal of talk is heard of the construction of new mills and the building of railroads into the timber sections. In regard to railroad building, it is the general impression that work on the Western Pacific will be commenced within a reasonable time, and the towns along the route are offering facilities to the company. This road will be shorter than either the Central or Southern Pacific, and it is said it will cut a day off the length of time that it takes between San Francisco and St. Louis or Chicago. The mercantile community of this city has long felt the want of another transcontinental road, and though the road when in operation may eventually combine with the others, it will cause some reduction in freight rates and will increase the facilities of trade.

As regards our manufacturing industries in iron and

steel, a fair activity continues in most of them. The Union Iron Works and other similar institutions are doing quite well. The Pacific Steel & Wire Company will hold an election in September, and it is on the cards that H. E. Huntington, a relative of the great railroad magnate of past days, and the successor to his responsibilites, will be chosen president. Since his retirement from the directorate of the Southern Pacific, it was certain that he would find another active sphere of usefulness, and now it turns out to be in connection with this enterprise, which, under the management of Frank L. Brown, has built up a fine business all over the Coast. The present plant is to be enlarged. Meanwhile, the American Steel & Wire Company, which has a great plant in this city, is progressing in the same direction. There is room enough on the Coast for both establishments, when their opportunities have been fully developed.

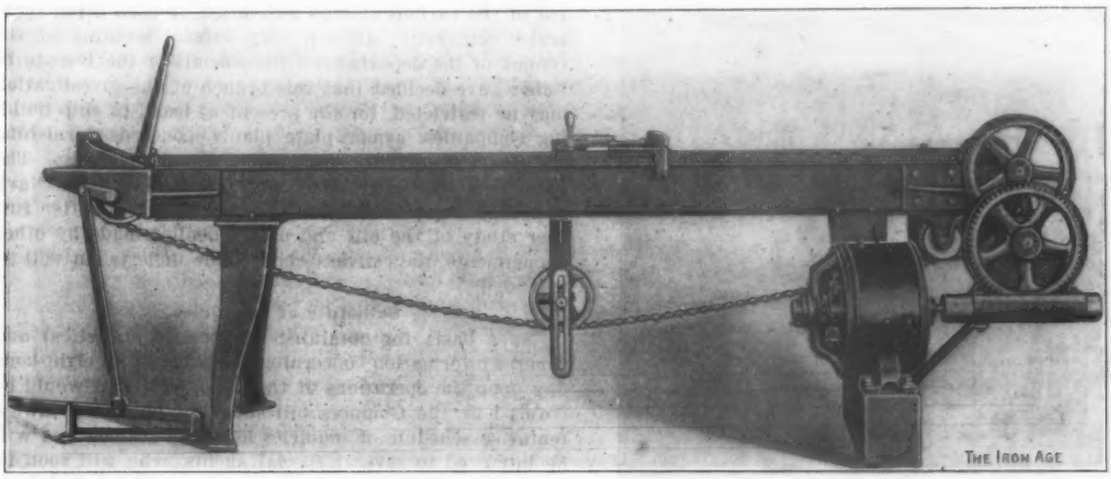
As regards exports, the shipments to Japan continue very large, although only one steamer, the "Coptic," has cleared during the past two weeks. This vessel had over $70,000 worth of machinery, hardware, splice bars, electric supplies, wire, agricultural implements, watch cases, steel plates, structural steel, cash registers, bar steel, trucks, &c., all of which, but a few thousand dollars' worth that went to China, were intended for Japan. By the way, the British steamer, recently captured by the Russian Vladivostock fleet, seemed to have in its cargo the steel rails shipped from here. It will necessitate their replenishing from the East very soon. The "Ventura" to Australia had quite large consignments of machinery for Australia and New Zealand.

J. O. L.

Proposed North Channel of Chicago Drainage Canal.—Isham Randolph, chief engineer of the Sanitary District of Chicago, has completed his survey and drawings of the proposed route of the northern connecting link of the drainage canal system. This canal is to connect the north branch of the Chicago River at Lawrence avenue with Lake Michigan just north of Evanston. The canal, as projected, will have a length of about 43,000 feet, a depth of 12 feet below the lake level, and will be 40 feet wide on the bottom and 80 feet wide at the water level. The plan includes the erection of a large pumping station, probably at the junction of the canal with the Mayfair division of the Chicago & Northwestern Railway in Evanston, this pumping station lifting the water 3 feet only, or just sufficient to create a flow southward. About $2,500,000 will be required to complete the canal exclusive of bridges or the pumping station. This canal will afford a constant flow of clean water from Lake Michigan southward through the north branch of the Chicago River, which is at present badly contaminated, and will permit the reversal of all sewers from Evanston southward which now empty into the lake, so that the sewage will be discharged into the canal instead of the lake. In connection with the south branch of the Chicago River, the main drainage canal and intersecting sewers on the south side of the city, this new canal will complete the work of freeing the lake from all sewage contamination from Evanston southward practically to the southern limits of the city. The canal project is only on paper thus far, although enabling legislation has been made, and it is only necessary to secure the necessary funds from a tax levy to begin active operation.

The Gould & Eberhardt Draw Bench.

For drawing copper and brass tubing, molding, rods, &c., through stationary dies, two new draw benches have recently been brought out by Gould & Eberhardt of Newark, N. J. They are made in light and heavy patterns for either belt or motor drive. The accompanying illustration shows one of motor driven form, 8 feet long, which is a size especially suitable for jewelers' use. The motor is direct connected and drives through worm and worm gear, giving a smooth, steady draw, and also provides an automatic return movement for the tongs.



AN 8-FOOT GOULD & EBERHARDT DRAW BENCH WITH MOTOR DRIVE.

The bed of the bench, though light, is of a stiff steel channel construction, rigidly braced. All operations are performed from the front or die end of the machine, and the throwing in of the feed or automatic return is accomplished by means of the hand lever shown. This, through the horizontal side rod, operates a clutch and an extra train of gears. A foot treadle may be used to perform the same office as the hand lever, and can be used when the operator's hands are otherwise engaged, as when holding or adjusting dies.

A heavy chain and sprockets are used for the drawing, the hook end of the tongs resting in the links of the chain. Rollers in the bed suppport the chain and a suspended idler roller takes up any stretch which may occur. The tongs are of the regular lazy type and have steel faced jaws. When the machine is to be used for drawing hollow tubing the jaws are fitted with a center plug or tongue, which may be readily removed when flat work is to be again resumed.

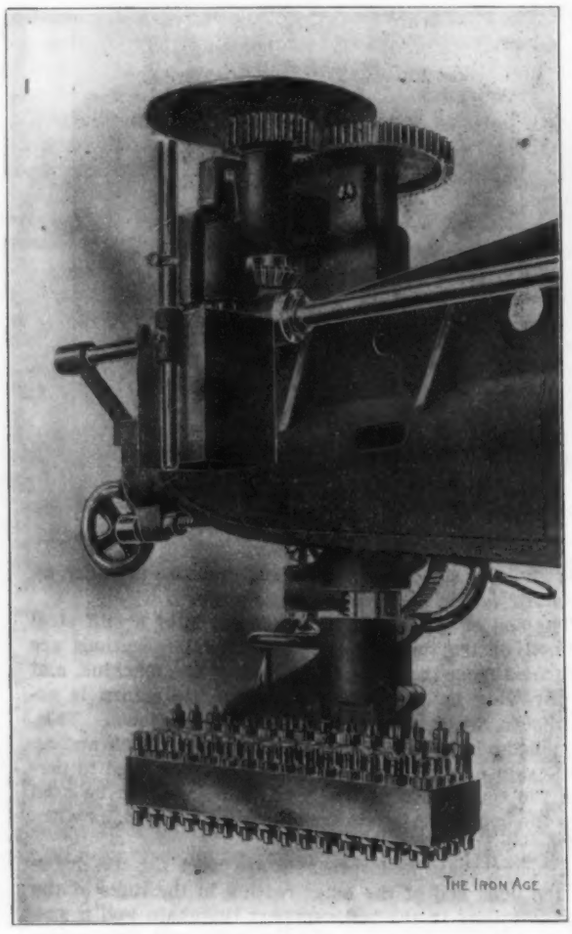
The illustration shows the open style of head against which the die rests. Another style of head is made of box form, in which the dies are held in place by top and bottom set screws. A small shelf extends outward from the front of the head, on which the dies can be set. The light pattern bench, the one shown herewith, is made in 6, 8 and 12 foot lengths, and the heavy pattern, which has an additional supporting leg at the center, is made in 8, 12, 16 and 18 foot lengths.

The Demurrage Question.—It is semiofficially announced, that henceforth demurrage records will be accurately kept by railroad companies, the bills presented and payment insisted upon. At a recent meeting at Atlantic City, representatives were present from the Penn-

sylvania, Baltimore & Ohio, Reading, Lehigh Valley, Central Railroad of New Jersey, Chesapeake & Ohio and the Norfolk & Western companies. A rigid collection was agreed upon, some of the roads which have in the past opposed such enforcement of the rules yielding to pressure brought to bear by the Pennsylvania and the Baltimore & Ohio. It was positively decided that the embargo rule shall be enforced in every case where demurrage charges are not promptly paid. All of the roads reported an increased collection of these charges, and greater increases are expected this month.

The Mueller Multiple Spindle Drilling Attachment for Radial Drills.

It is sometimes necessary to drill hundreds or even thousands of holes in a metal surface that it would be impracticable to place beneath the ordinary multi-spindle vertical drill. For such work the Mueller Machine Tool Company of Cincinnati, Ohio, has designed a multiple



THE MUELLER MULTIPLE SPINDLE DRILLING ATTACHMENT.

spindle attachment to be used in connection with radial drills, which is shown in the accompanying illustration.

The main casting or head is clamped to the machine sleeve, which is raised and lowered by means of its rack and pinion. The radial spindle runs loose in this head, and by means of teeth cut on the spindle next to the sleeve drives the sixth in the first row of 15 spindles, each having its own pinion and intermeshing with its neighbors. These spindles are spaced 1½ inches between centers, and each drives three other spindles in rows at right angles to the first row and 1⅛ inches apart, which is necessary in order that the teeth of their gears may pass one another, inasmuch as they are running in opposite directions. There are thus 30 right hand and 30 left hand drills. With the aid of a graduated dial on the cross screw and a table having its adjustment at right angles with the radial arm, all holes can be drilled with accuracy down to ¼-inch center distances. This particular attachment was originally manufactured on special order for one of the company's customers, but the usefulness of the device for various applications may readily be appreciated.

The Eight-Hour Inquiry.

Shipbuilding and Armor Plate Makers to be Interrogated.

WASHINGTON, D. C., July 26, 1904.—The Bureau of Labor, which is now conducting an investigation concerning the desirability of a national eight hour law, as contemplated by the so-called Gompers bill, is about to undertake a canvass of the manufacturing concerns throughout the country, which are included in the Bureau's category of the producers of articles that would doubtless come within the provisions of the proposed law.

The text of the opinion of Solicitor Collier, concerning the scope of the Gompers bill, has been very carefully studied by the officials of the several executive departments, to whom it was forwarded with a request for a list of the various articles purchased by each department under contract. After a very careful scrutiny of the replies of the departments, the officials of the Bureau of Labor have decided that this branch of the investigation may be restricted, for the present at least, to ship building companies, armor plate plants, concerns furnishing the Government with sea coast gun carriages, &c. The inquiry is thus limited to contracts made by the Navy and War Departments, but it is possible that, after further study of the bill and of the replies made by other departments, the canvass about to be undertaken will be extended.

Schedule of Inquiries.

As a basis for obtaining the desired statistical and general information concerning the effect of an eight-hour day upon the operations of those concerns that would be covered by the Gompers bill should it become a law, a tentative schedule of inquiries has been framed and will be intrusted to several special agents, who will soon be detailed to visit the plants in question. This schedule is framed to cover all the plants producing the articles affected by the bill, but a number of the inquiries included are addressed especially to those that, within recent years, have reduced the number of hours in the workday. The schedule, which, of course, is subject to change until the inquiry is actually undertaken, embraces, among others, the following questions:

Average number of employees?

Working hours per day?—per week?

When did above working hours first go into effect in this establishment?

Working hours immediately previous to the adoption of the above schedule—per day?—per week?

In reducing the working hours as above, what reduction or change, if any, was made in the *daily* wages?

What change, if any, in the cost of manufacture resulted from the reduction of hours (state increase or decrease in the form of a percentage)?

Is this statement in regard to cost of manufacture based upon a careful keeping of cost figures, both before and after the change in hours, or upon a general familiarity with the business?

What are the periods covered by the above comparison—before change?—after change?

How does the quality of product since the reduction of hours compare with that before the reduction?

How does the quantity of product per employee since the reduction of hours compare with that before the reduction (state increase or decrease in the form of a percentage)?

If less, has it been necessary to increase the days of running time during the year?—or the number of employees?

Were the changes in cost of manufacture, or quality or quantity of product, since the reduction of hours, due wholly or in any part to any changes other than the above mentioned changes in hours and daily wages?

Does this establishment do any work or manufacture any articles for the United States or any Territory or the District of Columbia under contract or subcontract?

If so, what per cent. was such work of the total work or product of the establishment during the last year; what per cent. of all the work or product of that particular kind?

What per cent. of the product of this establishment, if any, was exported during the past year?

The Labor Bureau officials are not at all sanguine that the returns based on this schedule will supply any very important information, but they believe it will furnish all the data capable of being compiled in statistical

form that can be obtained. A special effort will be made to get into communication with as many manufacturing plants operating on an eight-hour basis as possible, whether they are included in the very limited category of concerns coming within the scope of the bill, as construed by Mr. Collier, or not, and the fullest possible details of experiences before and since the adoption of the eight-hour day will be solicited. Up to the present time very few such concerns have been identified, and it is, of course, a well-known fact that they are extremely rare. It is believed, however, that a number of manufacturing plants can be found that are now operated continuously by three eight-hour shifts which formerly worked two 12-hour shifts, and full information regarding the change and the effects noted will be sought.

British Experiments Inconclusive.

The information bearing upon the general subject of the eight-hour day, which it was thought could be obtained from British sources, proves to be less conclusive than was supposed. Much has been made by the friends of the eight-hour movement of the experiment undertaken some years ago by the Salford Iron Works of Manchester, England, which, it has been claimed, demonstrated in a thoroughly practical manner the advantages of the eight-hour day over a working schedule which aggregated 53 hours per week. An examination of the report covering this test, which extended over a period of a year, shows the data obtained to be valueless so far as the present investigation is concerned. This plant was formerly operated under a time schedule of an extraordinary character, calculated to waste the strength and energy of the operatives and to load down the expense account of the concern very heavily. It was customary to start the works at 6 a. m., and to knock off for an hour at 8 for breakfast, after which operations continued until 12.30, when an hour and a half was taken for dinner, the men resuming at 2 o'clock and continuing until 5.30. On Saturday quitting time was an hour earlier than on other days. Having determined to test the eight-hour day, a new schedule was arranged with only one stop, the men going to work at 7.45 and working until 12, when an hour was taken for dinner, after which they worked until 5.30. On Saturday they worked one turn from 7.45 to 12 o'clock.

Not an Eight-Hour Day.

In reporting the results of the experiment the firm stated that the ratio of wages to turnover during the trial year, as compared with the average for the preceding six years, showed an increase of four-tenths of 1 per cent., which it was stated was offset by exactly the same percentage of saving in cost of gas and electric lighting, wear and tear of machinery, engines, gearing, &c., fuel and lubricants and miscellaneous stores. To any one familiar with manufacturing methods the only thing surprising about these figures will be the small saving effected in the cost of running the plant by the elimination of the wholly unnecessary and very costly stoppage for breakfast. The time lost in slowing down and starting up, not to mention the extra expense for heating and lighting the plant, keeping the fire under the boilers, &c., must have been a very important item, and why the saving was not greater, under the more rational system afterward adopted, is something of a mystery.

Another condition which undoubtedly had an important bearing upon the results of this test was the fact that it was begun after a conference with the representatives of the trades unions in the industry, who agreed not to undertake to force other manufacturers to an eight-hour basis until the conclusion of the test, and a strong appeal was made to all the operatives in the works to make a special effort to keep the output up to the former standard.

No Good Work Before Breakfast.

It is hardly surprising that the change from such a system as was in force before this test to that subsequently employed, or, in fact, to any other schedule of time involving but a single stop and permitting the operatives to get breakfast before coming to work, should have shown satisfactory results. The report on the experiment begs the whole question, however, when it states that "there is no doubt that the results obtained at the Salford Iron Works, together with those at other places, demonstrate that the two morning hours before breakfast are not worth the pains and trouble they cost, whether to workpeople or to employers," and that "the effect on the workpeople must be most damaging, both physically and mentally; otherwise we cannot account for the remarkable and indisputable fact that when these hours were struck off, as much work was performed, all the year round, as when these hours were employed." It should be noted, however, that, while the report speaks of striking off two hours every morning, which would appregate 12 hours per week, the actual reduction was but five hours per week. The gist of the whole matter seems unquestionably to have been the elimination of an unnecessary stop and the adjustment of the time schedule so as to obviate working on an empty stomach.

W. L. C.

New Publications.

Lectures on Iron Founding. By Thomas Turner, Professor of Metallurgy in the University of Birmingham, England. Publisher, J. B. Lippincott Company, Philadelphia. Pages, 136. Cloth.

This is not designed as a text book for the instruction of molders. It consists of a series of lectures delivered before audiences consisting chiefly of men actually engaged in iron founding and allied industries. The information given is of a character desired by practical men, who wish to add to their fund of knowledge scientific facts relative to the materials they use and the processes they employ. Five lectures are embodied in the series, covering the characteristics of iron ore, the operation of a blast furnace, the constituents of cast iron, foundry practice and tests for cast iron. The book is profusely illustrated.

The Ironmonger's Workshop. A Handbook of Methods and Materials for Manufacturing Ironmongers and Workshop Assistants. Published at the offices of the *Ironmonger*, 44 Cannon street, London, E. C., England. Pages, 362.

As the title indicates, this is a book intended for use by practical men in small workshops doing a great deal of general jobbing or repair work. It covers everything from working in sheet metal and light forging to plumbing, steam fitting and machinery installation. Methods are given for doing work of an unusual character, not likely to be covered in an ordinary apprenticeship course. Numerous tables of value to metal workers, formulæ for workshop use, and recipes for making many useful compounds form a considerable part of the volume. While it has been designed especially for English workmen, much of the information given would be found equally available for American use.

A Ball Bearing Rifle.—A ball bearing rifle—a new departure in weapon construction—is described in a recent article in the London *Times*. It is the invention of an Englishman, and differs from the ordinary rifle in that the grooves in the barrel are replaced with lines of small ball bearings, along which the hard steel projectile slides. The inventor claims a 40 per cent. greater average velocity, penetration and range than can be obtained with the same weight of projectile and charge in guns of the ordinary construction. His 0.393 gun has a muzzle velocity of 3200 feet per second and a point blank range of 650 yards, as compared with a range of 480 yards, obtained with a British service rifle of the same bore and using the same charge. While a ball from the latter will penerate 72 1-inch boards, the new gun will pierce 116. It is also claimed that there is a greatly decreased recoil, obviating the use of complicated mountings. The reduced friction also decreases the heating of the barrel, which tends to throw a gun out of action. Twenty of these new guns of 6-pound size are now being tested in service by Japan.

The Iron Age

New York, Thursday, July 28, 1904.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
CHARLES KIRCHHOFF, - - - - - - - - - EDITOR.
GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.

The Iron Age Index.

The index to the reading matter of Volume 73 of *The Iron Age*, for January 1 to June 30, 1904, has been compiled and printed, and will be mailed to those subscribers of *The Iron Age* who will make application for it.

To relieve those who bind or file *The Iron Age* of the trouble of future applications for the semiannual index, we have a special list to whom the index is forwarded without further notice. Subscribers who desire to be entered upon that list will kindly so advise us.

The British Tariff Commission's Report.

The Tariff Commission organized last December at the suggestion of Mr. Chamberlain has published its report, according to cable dispatches of the past week. This commission, composed of a number of the ablest men in British manufacturing industries, is wholly unofficial in its character, having no authorization from the Government, but representing the desire of the various trades to secure relief from annoying competitive conditions. The organization of such a commission was a most remarkable proceeding in a country so conservative as Great Britain. The customary British form of handling any question exciting public interest is through Parliamentary commissions, which are so numerous that they are undoubtedly constituted quite easily and upon comparatively slight agitation. In this instance, however, the demand for an investigation came from those who favored a return to protection in some form and was therefore so palpably a part of the Chamberlain propaganda that it could not well be recognized by the Government. Nevertheless, although the commission is practically self appointed, the character of those composing it is so high that the facts compiled, the opinions expressed and the conclusions drawn must be received with respect and may possibly lead to important results. Even though the criticism may be made that the Commission would not be judicial in its judgment, being composed of interested persons, yet it must be conceded that if facts are to be ascertained relative to the condition of an industry none are so competent to conduct such an inquiry as those who are actively engaged in it. From the meager dispatches which have thus far come to hand, the inference is strong that the British public has been given a presentation of the state of British industries and especially of the iron and steel trade which will induce serious thought.

The report states that the iron and steel industry of Great Britain has declined in comparison with other countries, which is ascribed to the fact that the manufacturers of America and Germany have secured control of their home markets by means of high tariffs and an "organized system regulating their export trade," that they are in a position to dump their surplus products on the British and other markets irrespective of cost, and that the dumping could not be carried on in Great Britain except for her system of free imports. The manufacturers of America and Germany are thus specifically alluded to, showing that it is their competition which is particularly felt. Belgium has long enjoyed a good market in England for certain classes of its iron and steel products and Sweden has likewise been able to find good customers in the island kingdom, but these countries have not increased their output to any considerable extent and their competition has always been ignored. America and Germany, however, have grown prodigiously, and whereas not man years back Great Britain produced more iron and steel than both united, she has recently been distanced by Germany, while America turns out more than twice as much as she does. For some considerable time the British iron and steel industry has practically remained stationary. To say that it has declined seems too strong a phrase to use, as it is by no means in a state of decay. But it has not grown, although the world's consumption of iron and steel has risen rapidly within recent years, and the fact that it is at a standstill while America and Germany are advancing with such great strides is regarded with apprehension by the Chamberlain school of economists. They foresee that unless some remedy is applied England's great competitors are likely to crowd her out of markets in which she has long been supreme. To take away the export trade of British iron and steel manufacturers would mean the shrinkage of the British iron and steel industry nearly one-half, as the home consumption averages but little more than half of the output. This would be serious enough without the invasion of the home market by dumping, from which British manufacturers have suffered in recent years. It is therefore by no means surprising that the commission has decided in favor of a system of tariffs. The scheme suggested is stated to be as follows:

A general tariff consisting of a low scale of duties for foreign countries admitting British wares on fair terms.

A preferential tariff, lower than the general tariff, for the colonies giving adequate preference to British manufactures, and framed to secure freer trade within the British Empire.

A maximum tariff, consisting of comparatively higher duties, but subject to reduction by negotiation to the level of the general tariff.

The formulation of such a set of recommendations for the consideration of the British public is a momentous departure from the position heretofore held by British iron and steel manufacturers. They have not only been among the most sturdy supporters of absolute free trade but have been practically unanimous in their devotion to that policy in international trade. The expression of such views by the most prominent men in the trade indicates not only the fear of overpowering competition in the iron and steel industry but a great change of opinion among British manufacturers generally as to the soundness of the British position with respect to the maintenance of open ports. The world, instead of being converted to free trade, appears to have grown more strongly in favor of restrictive tariffs. To preserve their home market, the British manufacturers now favor the imposition of restrictive duties by their own country, and to retain their footing in the world's markets they advocate still higher duties on the products of those countries which do not admit British wares on fair terms. It remains to be seen what attention will be given to these recommendations by British law makers. The present Parliament will probably not be inclined to move in that direction. But the leaven has been very skillfully put to work and must in time have its effect.

The New York *Times* calls attention to two incidents of the past week which show most forcibly how the financial situation has changed within the year. The annual meeting of the Virginia-Carolina Chemical Company

brought out a full explanation of the circumstances under which it some months since paid a commission of $1,000,000 to secure a loan of $6,000,000. That the company's condition was sound was demonstrated by a number of conclusive circumstances, but at the time the money was imperatively needed it could only be had with extreme difficulty for even legitimate business. In sharp contrast with that company's hard experience is the ease with which the Westinghouse Electric & Mfg. Company has supplied its requirement for capital to finance some development and investment propositions. It found bankers prepared and very willing to advance $4,000,000 for a moderate commission; the bankers disposed of their takings before the ink was dry on their contract, and the obligations issued went to a premium. The present plethora of money and the confidence of financial interests are in sharp contrast with the conditions ruling last year at this time, when severe liquidation was in progress and apprehension of a panic clouded the country. The restoration of easy times financially gives promise of a reasonably early return of more active trade.

A Change in British Patent Laws.

A radical change in the granting of patents will go into effect in Great Britain on the first day of next year. The British patent laws as they now stand have been very unsatisfactory to both inventors and the public, because a patent has always been granted at the risk of the applicant, without any efficient search being made into the originality of the alleged invention. Complaint was made that patents which had absolutely no right to exist were too frequently used for the purpose of levying blackmail on manufacturers and others interested in goods manufactured under patents which were valid. The inventor has been given no warning whatever that his supposed invention was in reality no invention at all. Naturally a patent had much less value under such a system than it would have under the patent laws of the United States, Germany and some other countries. As a consequence of repeated complaint, the British Board of Trade appointed a commission made up of eminent men to investigate the question, and as a result the patent law of 1902 was passed. The important clause relating to examinations was not made immediately operative for various reasons of expediency, but now the Board of Trade has set the approaching January 1 as the date of the beginning of a new order of things in the British patent office.

The commission did not look with entire favor upon the American system, the principal objection being that too much power is given the patent examiner, who has to act as both advocate and judge, as the *Engineer* puts it. Too much is placed on the judgment of this one man. Another defect brought out was that no intimation is given the applicant of the extent of the examination, and the search must of necessity be imperfectly carried out. Consequently a sort of compromise was selected as the best system to be applied in Great Britain.

Under this new law the British patent office cannot refuse to grant a patent, but it can so label it that it will be apparent to all that the idea in question lacks originality. It will be the duty of the office to make an investigation for the purpose of ascertaining whether the invention claimed in any complete specification has been claimed or described in the specification of any British patent within the 50 years next before the date of the application. It will thus be seen that the scope of the search is strictly defined, but this search is to be thoroughly made, so that any one who afterward desires to continue the investigation may begin where the patent office left off. In most cases the 50 years will be sufficient, for the present, at least. Ten or twenty years from now it will probably be necessary to extend the scope of the examination to 60 or 70 years, or it may be extended in a few years to make the search more thorough, dating back from the present year as the basis. No power of refusal is given under the act. But when any prior specification is found which appears to anticipate the applicant's invention, it will be the duty of the comptroller of the patent office to inform him of the objection and to give him the opportunity to amend his application so as to make it clear that he is not seeking to claim what is not new. And then, and here comes the protection to the public, unless the objection be removed it is the duty of the comptroller to decide "whether a reference to any, and if so what, prior specifications ought to be made by way of notice to the public." In other words, the duty of the comptroller will be to bring out in the patent itself the fact that the invention, so called, is not really an invention at all. The specification will bear on its face what has gone before, which will protect the legitimate inventor from the tricks of those who would use the patent office to further dishonest schemes.

The Jones & Laughlin Steel Company.—PITTSBURGH, PA., July 27, 1904.—Some excellent records for production have been made recently in the Talbot open hearth furnace in the American Iron & Steel Works of the Jones & Laughlin Steel Company, Pittsburgh. The quantity of steel turned out has been so large—amounting to 1600 to 1800 tons per week—and the quality so satisfactory that the company has decided to build three more Talbot furnaces, and possibly four, of the same size as the present one. Work has already been started on one of these furnaces. The company is also installing 21 soaking pits in its steel department, as it has been short of heating capacity for some time. To provide room for these soaking pits, a continuous bar mill, known as mill No. 45, is being removed to another part of the plant. The company is now operating its entire plant to nearly full capacity.

The Frick Coke Company Will Build 1000 New Coke Ovens.—We can state officially that the H. C. Frick Coke Company, Pittsburgh, will build 1000 new coke ovens, all in the Connellsville field proper, work on which will be started early in August. Contracts for labor and materials for these new ovens were placed in Pittsburgh this week. These are the first new ovens to be erected by the H. C. Frick Coke Company in the Connellsville field since the organization of the United States Steel Corporation. The ovens will be of the beehive type and are expected to be finished early next year.

The Union Rail Company.—The Union Rail Company, Huntington, W. Va., has arranged for additional working capital and will equip its plant for rolling brake beams and special shapes in addition to light section rails. The low prices ruling for some time on light section rails has compelled this company to engage in the manufacture of shapes and bars, and this action it is said will be followed by several other mills that have heretofore been rolling rails exclusively. The Union Rail Company also has under consideration plans for building a 30-foot furnace for reducing heavy standard section rerolling rails to weights of 56 and 60 pounds per yard.

The recent ruling of the Factory Inspecting Department of Pennsylvania that all large buildings must be provided with proper fire escapes, has brought many orders to the fire escape manufacturers.

Canadian Trade Affairs.

Higher Duties Wanted.

TORONTO, July 22, 1904.—George E. Drummond, president of the Canadian Manufacturers' Association, was the guest of honor at a banquet given by the members of the association on Thursday night in Montreal. Mr. Drummond is head of the Canada Iron Furnace Company, the company which took over the Londonderry Iron properties in Nova Scotia, and is prominent in the car wheel industry of Canada. The occasion of the banquet was his return from England, whither he had gone as one of three representatives sent by the Montreal Board of Trade. While there he met Mr. Chamberlain and discussed with that statesman the policy of mutual trade preferences within the British Empire.

To the speech Mr. Drummond made on Thursday night considerable attention has been paid by the newspapers, several of his remarks being regarded as noteworthy. For one thing, he said that he could safely predict that the influx of British capital in the next five years would equal that of the last ten. He is persuaded that this country is rising rapidly into British favor as a field for investment. On the subject of preferential trade, he said that Mr. Chamberlain's views were not such as they are widely represented to be in Canada. In conversation with Mr. Drummond the ex-secretary for the colonies took the ground that Canada could give special tariff concessions that would be of great advantage to the United Kingdom without injurying established Canadian industries. In other words, to favor Great Britain and thereby secure reciprocal benefits in the British market, Canada would not, in Mr. Chamberlain's opinion, be required to abandon any of the protection it now enjoys. This country now imports from the United States, Germany and other non-British countries scores of millions of dollars' worth of manufactured goods. The general tariff could be raised so as to close these foreign countries out of that business, and the preferential tariff could be adjusted so as to transfer the greater part of the same business to Britain. Thus, by the scheme Mr. Chamberlain and Mr. Drummond discussed, Canada could give Britain a substantial preference entirely at the expense of the manufacturers of other countries. On this subject Mr. Drummond added:

> I am convinced from what I heard and saw in England that the time has arrived when our Parliament should voice the wish of the Canadian people as expressed by our trade organizations in every center, from Sydney and Halifax to Vancouver and Victoria, that the general interests demand that we combine together now and endeavor to evolve a mutual preferential trade arrangement that will make for the permanent consolidation of the Empire. I believe further that much of the opposition which Mr. Chamberlain is experiencing in Britain would be removed if our Canadian Parliament would now face the question of Canada contributing in a Canadian way and on the initiative of our own Parliament to the naval defense of the Empire. We owe it to our self-respect to do this.

In his opinion, the general duties should have been raised at the time the present preference to Great Britain was granted. Had it been raised, he said, Canada would possibly have bought less of British woolen and cotton goods, but this would have been made up for many times by the increased Canadian purchases of other British goods, especially of iron and steel products, such as are now being imported largely from the United States and Germany. He considered the main reason why the existing preference proved of so little value to Britain to be that there were so many articles on the general free list. In any case, irrespective of what Britain may be prepared to do, Mr. Drummond thinks Canada ought to have higher duties.

The Sydney Strike.

On Friday the grand subcouncil of the Provincial Workmen's Association of Cape Breton surrendered, and the strike of the Dominion Iron & Steel Company's men came to an end. There were no conditions on the company's part, save that as many men as possible would be taken back to their former positions, unless in cases where such positions were forfeited by conduct during the strike, by incompetence or any other cause. It is understood that 28 of the former employees will never again be engaged in the company's service. While the company leaves the men free to join any association they like, it also leaves itself free to employ whom it pleases. The strike may have been shortened slightly by the intenvention of the Deputy Minister of Labor, for the men might have held out longer against the acceptance of defeat directly than through his mediation. Certainly their hope of winning must have dwindled to zero before his efforts at conciliation began. There were about 1000 hands at work when the final meeting of the Provincial Workmen's Association was held, and capitulation was decided on. From the moment that the military power interposed to prevent violence and protect the company's employees, the strikers rapidly lost ground. Three of the company's open hearth furnaces were lighted nearly a week before the finish of the strike. The wages paid to the returning strikers are just what they were getting when they went out. The company's statement of the wages it paid may be of interest to employers of labor in American steel works. It is as follows:

For the half-month ending May 31, 1904, there were 2348 names on the pay roll. The maximum number employed on any day was 1997. The average number for the half month was about 1903. The fluctuation was almost wholly confined to the men employed at the lower rates, partly because all special requirements from day to day are ultimately filled from their ranks, the men so utilized being for the time paid at the highest rate attached to the work they are temporarily doing.

The working of this rule renders the preparation of an exact schedule impossible, but the following is substantially correct:

There were 63 employees (including boys, apprentices, &c.) not receiving men's pay whose wages ranged from 67 cents to $1.25 per day.

There were 543 names on the list, including 275 foreigners, rated at $1.30 per day, but many of these were on better paid work, and the average number of laborers at this rate was under 270. The remaining names were rated as follows:

Per day.	Men.	Per day.	Men.
$1.35	220	$1.78 to $1.85	140
1.40	155	1.86 to 2.00	72
1.45	125	2.04 to 2.25	141
1.48 to $1.50	54	2.29 to 2.50	67
1.53 to 1.55	189	2.25 to 2.75	40
1.56 to 1.60	207	2.76 to 3.00	26
1.62 to 1.65	112	3.06 to 3.50	19
1.68 to 1.75	129	3.80 to 4.25	43

Of the men rated at $1.30 per day, 37 men who worked part of the time on tonnage earned from $52 to $80 per month. Of those rated at $1.40, 25 men who worked part of the time on contract work earned about $1.60 per day. Taking various occupations and trades the following partial list may be given:

Common labor, $1.30 to $1.35 per day.
Common labor, 12-hour shifts, $1.56 to $1.62 per day.
Common labor, handymen, $1.40 to $1.80 per day.
Carpenters, $1.91 to $2.34 per day.
Carpenters, handymen, $1.50 to $1.80 per day.
Boiler makers, skilled, $1.91 to $2.55 per day.
Molders, skilled, $2.50 to $2.76 per day.
Machinists, $2 to $2.97 per day.
Blacksmiths, $2.12 to $2.96 per day.
Pipe fitters, $1.90 to $2.50 per day.
Bricklayers, $3.80 per day.
Other skilled labor up to $4.25 per day.

Dumping Penalized.

Customs collectors are now giving very close attention to the value of articles on which there is a specific duty. In the past their concern about market prices was confined to articles on which the duty was ad valorem. If an importer entered at a low price any goods that were subject to an ad valorem duty, it was the business of collectors to make sure that the goods in question had not really cost him more, and it was their practice to assess the duty on the current market price, so that the ad valorem returns to the revenue might be as large as possible. This, too, was purely in the interests of revenue and without consideration for the advantage of home manufacturers of like articles. But the prices paid for pig iron, wire nails and all articles on which the duty is specific, did not interest the collectors.

Under the new dumping provision of the tariff all that is changed, and it is obligatory on the collector to search into market values and the actual prices of all dutiable articles, whether the rates be ad valorem or specific. Take the case of wire nails. They are dutiable at 3-5 cent per pound; formerly it made no difference to the collector at what price they were entered, so long as he knew what they weighed he could get all the duty that he was entitled to collect. But now he must keep an eye

on prices. Suppose small wire nails are regularly sold in the United States at $1.90 per 100 pounds, and that a lot is shipped to a Canadian dealer at $1.70. He would have to pay duty as follows: 1. The regular duty of 3-5 cent per pound—that is, 60 cents. 2. The dumping duty, which is to be equal to the difference between the regular price and dumped price, unless such difference exceeds 15 per cent. ad valorem, the dumping duty in this case being the full 20 cents; the total duty, therefore, would be 80 cents. Hence, if the dumping is detected, the nails would cost the buyer as much as if the full price had been paid to the United States seller. By paying the Dominion Government an extra duty amounting at most to 15 per cent. ad valorem, American manufacturers may dump goods here as freely as they please. If it does not profit them or advantage Canadian dealers, it will at all events swell Canada's revenue. C. A. C. J.

Notes from Great Britain.

The Market Stagnant, But More Hopeful.

LONDON, July 16, 1904.—*The Iron Age* review, in its issue of June 30, of the half year's trade in America might equally have been penned to describe the half-yearly course of trade over here. The market opened weak, grew stronger toward the end of March, and tapered away toward the end of the half year. Nor does the resemblance end here, for just as with the turn of the half year a feeling of confidence returned in America, so in like manner, notwithstanding the holiday season, which over here counts for a good deal, a slight feeling of hopefulness has shown itself.

The most important market event this week has been the Birmingham summer quarterly meeting, which, though not quite so well attended as usual, and not very encouraging in its outcome, nevertheless ended in a feeling of more hopefulness, coupled with rather more inquiry than has been experienced for some weeks. The consumers have, as is well known, been buying from hand to mouth so persistently that they are necessarily short of stock. This is all very well, but the weight of contracts on producers' books is also exceptionally small, and it follows that, things being as they are, the consumers have slightly the best of it.

The output of German pig iron seems likely to prove a record, with a production of over 4,150,000 tons for the first five months of the year, which indicates that the annual production may exceed 10,000,000. It is not, therefore, surprising that the demand from Germany for Cleveland pig iron shows curtailment, and this coming simultaneously with a falling off in Scottish requirements, hurts the trade badly on the northeast coast. Not only has the demand from Germany for Cleveland pig iron been curtailed, but it is expected that Germany will shortly be competing for pig iron orders outside the Zollverein, and this means cut prices.

The United States Steel Corporation has again been feeling the market, offering steel billets and sheet bars at about 85 shillings, only large contracts being asked for. Sales have been secured by the American agents to consuming firms, who operate on the coast, but no success has attended their efforts in the Midlands. The quotation for American steel is harder for delivery in the Midlands than is British steel, and whatever sales were going, therefore, went to British makers. On the whole, the steel market is in a much more healthy condition than the iron market, the failure last week of James East & Co. of Bilston coming at the end of a dismal succession of similar incidents.

The Canadian Preferential Tariff.

An order has just been placed in England, which illustrates that occasionally the Canadian preferential tariff is of some service. The Midland Iron Works, at Donnington, has received from Toronto an order for a steel tank 184 feet diameter by 33 feet deep, and a telescopic gas holder of four lifts, to be erected in it. The capacity of the holder will be equal to 3,000,000 cubic feet of gas, and will be the largest in Canada. The total amount of the contract for tank, gas holder and guide framing will be about £30,000. The competition with American firms is very keen, and it is said that the preferential tariff just turned the scale in favor of English makers.

A Rapid Piece of Engineering

Last Sunday morning one of the largest operations in railway bridge transformation attempted in the time took place on the London, Tilbury & Southend Railway, where it crosses the main line, sidings and shops of the North London Railway Company's works at Bow, by means of a bridge 160 feet span, with a hight of 26 feet between the rail levels of the two lines. The old bridge was not up to modern requirements, and had to be renewed. The new bridge was built by the side of it, and last week was completed. It was decided to roll this into its new position for carrying the railway after the traffic had stopped on Saturday night last. The total weight of the new bridge with the permanent way, when ready for moving, was 420 tons. The last train passed at 12.40 a.m. on Sunday, and the first train came across the new bridge at 20 minutes past 11. Thus a passenger traveling by the last train on Saturday night would cross on the old bridge and could have returned over the new bridge 11 hours later, which proves it to be a very rapid piece of engineering. The work was carried out by Head, Wrightson & Co., Stockton-on-Tees, the contractors for the bridge, who were represented by Septimus Young, their London manager, and William Clark, works manager.

Installation of a Large Forging Press.

At Haywood Forge, Halesowen, last Saturday, Walter Somers & Co., Limited, with a view of meeting foreign competition, commenced to lay down a 3600-ton hydraulic forging press, capable of manufacturing marine forgings of 100 tons and upward. There will also be erected two electric cranes of 60 and 30 tons respectively, the cost incurred being over £25,000.

Shipbuilding Notes.

One of the most interesting events this week has been the trial made of a first-class torpedo boat built by Yarrow & Co., 152 feet long by 15 feet wide, with a displacement of about 140 tons. It is in the propelling machinery that the chief interest lies, as, indeed, may be said of nearly all torpedo craft. The boat is fitted with a combined system of steam turbine and ordinary reciprocating engine, an arrangement not altogether novel, and first suggested to Mr. Yarrow by Colonel Soliani of Genoa. In this boat, however, the reciprocating engine works on an independent shaft, and in this respect it differs from other vessels which have been fitted with the combined system. In former designs the reciprocating engine and one of the turbines have actuated one shaft in common. There are two turbines of the Rateau type, and they drive two side or wing propellers. There is a third or central propeller, which is actuated by an ordinary three-stage compound engine of about 250 horse-power. It is well known that the range of power at which steam turbines can work with economy is limited, so that, if the machine be designed for a high power, it will be wasteful when exerting much less than its maximum. This is true also, to some extent, of the ordinary steam engine. In the boat under notice, for cruising speeds of about 10 knots the ordinary reciprocating engine alone is to be worked. It will then be running at about its full designed power, and will be at or near its maximum efficiency. When the highest speed, which is 25 knots, is needed, the two turbines are put in operation and the screws on all these shafts are used in propelling the vessel. The results which will be obtained from this boat will possess considerable interest for those engaged in the design of vessels of far larger size.

The question of credit in the shipbuilding industry is a ticklish one. The following comment on the subject by Sir Christopher Furness, at the annual meeting of Furness, Withy & Co., may be of some guidance to American shipbuilders, who find questions of credit arising from time to time. Sir Christopher said:

> I should, however, like to state that I consider the tendency of shipbuilders to give, and shipowners to take, long terms of credit as a most undesirable policy to pursue, and one calculated to produce an unhealthy atmosphere in the shipping world. Unfortunately, many of the principal shipbuilders, ourselves among the number, have been led by the keenness of competition to yield to this policy. Of course there are exceptional cases,

but on general principles the additions to the already vast tonnage of the United Kingdom, by means of such extended terms of payment, has a demoralizing effect on the freight market, without an equivalent gain to either shipbuilders or shipowners.

S. G. H.

PERSONAL.

C. E. Sanders has resigned the general superintendency of the manufacturing department of the David Bradley Mfg. Company, Bradley, Ill., to take effect about September 1, and will shortly after remove to Hoosic Falls, N. Y., to take a position with the Walter A. Wood Mowing & Reaping Machine Company. Mr. Sanders began with the David Bradley Mfg. Company in a minor position about 20 years ago, and has gradually reached his present one. He leaves with the best wishes of the officers of the company and of his old associates.

Col. Henry M. Adams of the Army Engineer Corps, now stationed at New Orleans, has been appointed to succeed Brig.-Gen. Theodore A. Bingham, in charge of the Government engineering works at Buffalo.

Frank H. Goodyear, vice-president of the Buffalo & Susquehanna Iron Company, sails on Thursday of this week for a six weeks' trip in Europe.

Thomas Gill resigned his position as superintendent of the coke tinning department of the Laughlin plant of the American Sheet & Tinplate Company, June 30. Mr. Gill is highly respected by both the management and his employees. On July 2 the tinhouse men and friends tendered him a reception and presented him with substantial tokens of their esteem. He has been succeeded by Baker Boyd, an ex-vice-president of the Tinplate Protective Association, having served in that capacity from the inception of the organization until about 18 months since, when he was appointed as assistant superintendent to Mr. Gill.

Henry C. Frick of Pittsburgh sailed on Saturday last for a prolonged tour in Europe.

H. E. Huntington has been made a member of the Executive Committee of the Board of Directors of the National Steel & Wire Company.

H. P. Usher, for many years general business manager for the Goulds Mfg. Company, Seneca Falls, N. Y., manufacturer of pumping machinery, has recently severed his conection with that company to engage in business for himself. Mr. Usher will locate in Los Angeles, where he has acquired an interest in the business of the S. J. Smith Machinery Company. A dinner was tendered Mr. Usher on Saturday evening, July 16, by the Goulds Mfg. Company, which was attended by heads of the various departments. One of the pleasant features of the gathering was the presentation to Mr. Usher of a very handsome gold watch and chain, suitably marked, as an evidence of the esteem in which he is held by his associates.

F. M. Trafton of Boston has taken the New England agency of the E. & G. Brooke Iron Company of Birdsboro, Pa. The company will increase its line of iron and steel cut nails, of which Mr. Trafton will make a specialty. He has leased the office of the Mount Hope Iron Company, at 176 Federal street. He has been connected with the Mount Hope Company for 27 years, for eight of which he was manager of the Boston office. Now that his old company is going out of business, the E. & G. Brooke Company will manufacture a similar line of cut nails, which Mr. Trafton will handle.

G. F. Ehrenzeller, owing to the winding up of the firm of C. W. Leavitt & Co., has established himself with headquarters at the Wall Street Exchange Building, New York. The well-known firm of Beir, Sondheimer & Co. of Frankfurt-a-M. and London, which he has represented for several years past, has transferred its business to him. Mr. Ehrenzeller also represents the Electro-Manganese Company, manufacturers of special low phosphorus from ferromanganese.

Gustav Asbeck, chief engineer of the Sack Machine Company, Dursseldorf-Rath, Germany, who has traveled in this country during the last nine months, returns home this week.

Alexander C. Humphreys, president of the Stevens Institute, Hoboken, N. J., was hurt on Saturday by a fall from his horse.

Albert Ladd Colby, metallurgical engineer of the International Nickel Company, was stricken with pleurisy early this month at St. Louis, where he was installing the exhibit of the company. He is now much improved and has come to New York.

Among the recent arrivals in this country on a visit to some of its works is Hans Herberg, engineer of the St. Petersburg Eisen und Draht Industrie of St. Petersburg, Russia.

James Boyle has succeeded W. H. Kelly as superintendent of the foundry of the Buckeye Engine Company of Salem, Ohio.

One of those monumental pieces of work of which the Germans are so fond is the memoir prepared on the occasion of the opening of the Royal Bureau for Testing Materials of the Berlin School of Technology, at Gross-Lichterfelde West, a suburb. It is a portly volume of 380 pages, crowded with illustrations and is the fruit of the industry of Prof. A. Martens, the director, and M. Guth, the architect. The Royal Bureau for Testing Materials, which in the early days of its history was largely engaged in routine tests, with a modest equipment has drifted in recent years into research work, and may well be regarded now as one of the foremost under Martens, Rudeloff and others. The new buildings are described in minute detail. The building has a frontage of 246 feet, and is flanked by two laboratories.

The Board of Public Works, Milwaukee, Wis., has decided to advertise for bids a third time for the new 20,000,000-gallon pumping engine for the North Point Water Works. The difficulty in awarding a contract is caused by a requirement that the company receiving the award shall operate under the eight-hour a day rule. As neither the Allis-Chalmers Company nor the Filer & Stowell Company, both of whom submitted bids at the first and second call, will agree to such a condition, it is likely that the contract will go to some outside company, if in the meantime the objectionable clause of the specifications is not declared to be contrary to law.

The labor trouble at the Merrimac Iron Foundry, Lawrence, Mass., has been settled. Thirty-five of the company's molders and coremakers went on strike because of the discharge of two members of their shop committee. An arrangement was reached by which the men returned to work after being out for two days.

The machinists' strike at Nashau, N. H., is virtually ended so far as the employers, the Mark Flather Planer Company and Flather & Co., Incorporated, are concerned, though it is still on in name. The manufacturers are hiring what men are needed without difficulty. Many of the striking machinists have left the city. Others are still picketing the shops.

The Brier Hill Coke Company, which is an identified interest of the Brier Hill Iron & Coal Company, Youngstown, Ohio, is building 200 ovens in the Klondike field, in the Connellsville region. About 100 of these ovens have been finished, and coke is now being shipped from them to Grace furnace of the Brier Hill Iron & Coal Company, at Youngstown. The other 100 ovens will be finished this year. The entire product of the ovens will be used by the Brier Hill Iron & Coal Company.

Witherbee, Sherman & Co., miners of magnetite ore, of Port Henry, N. Y., have sold 5000 tons of magnetite, to go to Glasgow, Scotland.

The Morgan Construction Company, Worcester, Mass., has opened an office at 40 Exchange place, New York, with E. A. W. Jefferies in charge.

OBITUARY.

HIRAM W. HAYDEN.

Hiram Washington Hayden, one of the founders of the Holmes, Booth & Hayden Company, Waterbury, Conn., died suddenly at his residence in Waterbury, July 18, at the age of 84 years. Mr. Hayden was born in Haydenville, Mass., February 10, 1820. He was educated at the old Waterbury Academy. His first work was for J. M. L. & W. H. Scovill, Waterbury, who had tried in vain to get some one to chase and engrave buttons, an art unknown at the time in America. In this work he succeeded and made what were probably the first chased buttons manufactured in the United States. The work proved to be too confining and in 1838 he went to Wolcottville with Wadhams & Co., button manufacturers. In 1841 he returned to the Scovills and continued to make their important button dies until 1853, in which year he joined with Israel Holmes, John C. Booth and Henry H. Hayden in the organization of the company known as Holmes, Booth & Hayden, which business is now incorporated as a constituent part of the American Brass Company. Throughout its history he was connected with this business, chiefly in its manufacturing department. Mr. Hayden was an inventor of a good deal of ability and a great many patents have been issued to him, most of which were assigned to Holmes, Booth & Hayden. Among his inventions were a breech loading rifle, a magazine rifle, a breech loading cannon, principles of which are embodied in the arms of to-day. A machine for making solid metal tubing was sold to a Pittsburgh concern. As a young man, while in Wolcotville, he invented and patented a process for manufacturing copper kettles by which was remedied the weakness of the old-fashioned coppersmith's kettle, a thinness at the angle of the side and bottom, the part where comes the greatest strain, being made the thickest. This patent he sold to the Waterbury Brass Company. Mr. Hayden was a man of strong artistic tendencies and this taste led him to the development of the daguerreotype, which resulted in his discovery, working along his own idea, to a method of photographing on paper. A scientific article, written by him in 1851 but never published, entitles him to the distinction of having been an independent discoverer of this process. He continued his photographic work through its modern development and in Waterbury was looked upon as a leader, having been president of the local Photographic Society. He also did a good deal in etching on copper, modeling in wax and sketching in charcoal and pencil. Although not a man to seek or to enjoy public life, Mr. Hayden did a great deal to further the best social and industrial development of his city. He was a widower at his death, but is survived by three children.

DAVID J. MATLACK.

David J. Matlack, a veteran iron founder, known in iron and steel circles throughout the United States and Canada, who for 56 years was connected with the Cramp Shipbuilding Company as superintendent of the iron foundry, died suddenly of heart disease July 25 at his home, in Langhorne, Pa. Born in Philadelphia 73 years ago, Mr. Matlack received his early education in the public schools. Shortly after leaving school he became an apprentice with the I. P. Morris Company. When the Cramp Company purchased the Morris property, 11 years ago, he continued with the firm. He was regarded as one of the foremost experts in his line in the United States, and was frequently consulted by engineers from different parts of the country and Canada. The day of his sudden death he had just completed the castings for the largest turbine wheel ever made. It is capable of developing 12,500 horse-power, and was constructed for a Canadian concern. On the completion of his fiftieth year of service in the foundry, Edwin S. Cramp gave a dinner in his honor in the Bellevue Hotel, which was attended by engineers from all parts of the country. A few months ago Mr. Matlack and his wife celebrated their golden wedding. He was a prominent Mason, and a member of the American Society of Mechanical Engineers, of the Engineers' Club, the Union League and the Foundrymen's Association.

NOTES.

F. W. WIGAND, a member of the Cooper-Wigand-Cooke Company, engineers and iron contractors, New York City, died July 23, from heart disease while bathing in the surf at Long Beach, L. I. Mr. Wigand was 48 years of age and had been engaged in the iron business for many years.

CHARLES FREDERICK SPANG, formerly of Pittsburgh, Pa., died at Nice, France, last week after a long illness. Mr. Spang was a pioneer iron man in the Pittsburgh district and was the first manufacturer of iron tubes west of the Alleghany mountains. He went to Pittsburgh with his father in his youth and was associated with him in the business of H. S. Spang & Son, whose works were at Etna. On the death of his father, Mr. Spang organized the firm of Spang & Co., having James McAuley for a partner. In 1858 the present firm of Spang, Chalfant & Co. was formed. Mr. Spang then removed to Nice, making occasional trips to Pittsburgh. He was one of the early directors of the Bank of Pittsburgh and one of the founders of the Western Pennsylvania hospital.

GEORGE FORDYCE BLAKE, a retired manufacturer and inventor, died at his summer home at Phillips Beach, Mass., July 23. He was 86 years old and a native of Farmington Falls, Me. Mr. Blake's most valuable invention was the steam pump, for which he was granted a patent in 1864.

GURDON G. WOLFE, president and treasurer of the Fowler & Wolfe Mfg. Company, Philadelphia, died suddenly on July 18. Mr. Wolfe was formerly in the stove manufacturing business in the Albany and Troy district, and in New York City. For the last few years he was associated with the late A. H. Fowler and others in the manufacturing of a type of wall radiator.

HARRY E. FOWLER, one of the assistant superintendents of the Homestead Steel Works of the Carnegie Steel Company, fell from a traveling crane in the mills, July 14, and died that evening from his injuries. Mr. Fowler was 29 years of age and had been but recently appointed to the position he held.

ADDISON B. DALLY, formerly superintendent of Zug & Company's Sable Iron Works, Pittsburgh, Pa., was recently killed by a train at Crafton, Pa. He was 78 years old.

JAMES REILLY, superintendent of the blacksmith department of the Pullman Car Company's works at Buffalo, N. Y., died July 13. Mr. Reilly had achieved widespread reputation for his mechanical and inventive ability, numerous improvements in the iron work of cars being the result of his experiments and invention. He was at the time of his death second vice-president of the National Railroad Master Blacksmiths' Association and president of the local branch of that order.

WILLIAM A. BUTLER, one of the founders of the Pierce, Butler & Pierce Mfg. Company, Syracuse, N. Y., died in that city July 10 of paralysis. He was born in Syracuse August 23, 1851, and entered Cornell University in 1869, graduating in the class of 1872 as a civil engineer. He then engaged in the civil engineering corps of the Lackawanna Railroad and was also identified with city work. He served on the engineering corps of several railroads throughout the State. He was one of the organizers of the Pierce, Butler & Pierce Mfg. Company, which was established in 1876. Owing to ill health Mr. Butler retired from active business in 1888. He was early interested in many of the important enterprises of the city, including the present Syracuse Lighting Company, of which he was one of the organizers, and the Steam Heat & Power Company. When active in business life, he was extremely energetic and deeply interested in enterprises of all kinds. Besides a widow, Mr. Butler leaves two sons and a daughter.

Last week wide currency was given to the report that the manager of the Homestead Steel Works had contributed $1000 for fireworks to celebrate the starting of the mill. It was a pretty story, but the fact is that the fireworks had nothing whatever to do with Homestead operations, but were in celebration of a religious festival by the Italians of the town.

Lake Mining Matters.

Ore Shipments Heavy.

DULUTH, MINN., July 23, 1904.—Shipments of iron ore are very heavy and bid fair to so continue for a considerable period. At the head of the lakes the Duluth, Missabe & Northern Railroad was troubled by a walkout of ore handlers at the docks, but it was settled in 24 hours. The road is moving from mines to docks from 35,000 to 40,000 tons per day and has a record for some recent days as high as 45,000 tons. The Duluth & Iron Range is moving through docks 30,000 tons daily and the Great Northern about 25,000 tons, a total for the Minnesota ranges of 2,500,000 tons a month. This is 12,500,000 tons for the season. Michigan roads are moving from their several ports of Escanaba, Marquette and Ashland at the rate of about 8,000,000 tons for the season, a total business for the lake region in the neighborhood of 20,000,000 gross tons. This is quite different from the figures of the prophets who talked not long ago of a total business for this year of not over 13,000,000 to 14,000,000 tons at the outside, but is about the figures made some time ago in this correspondence, which were from 17,000,000 to 19,000,000 tons. Three months ago this correspondence stated that it could not be figured out that shipments could fall much below 18,000,000 tons, "if the United States Steel Corporation did the business that was expected of it." Of course sales are not especially brisk, but ore ismoving off docks at the eastern end in a surprisingly active manner just now, and the ore trade looks better all along the line.

Railroad Operations.

The Duluth, Missabe & Northern road has been selling off its wooden ore cars, for delivery over a term of years, the trucks and frames alone being disposed of. The bodies of these cars, which were built in 1893 and later, are broken up and used for fuel. The company will replace all these cars with 50,000-pound pressed steel hopper cars, of practically the same type as the 400 now in use by it. General Manager McGonagle of this road figures that with 1000 steel cars, of the capacity now in use, he can guarantee to move not less than 8,000,000 gross tons of ore in a season, without the addition of any docks or of much other equipment. It is entirely probable that he will have opportunity to make his figure good in the course of a very few years, as the business of this road is steadily increasing and it is undoubtedly to become more and more prominent as the leading Steel Corporation ore carrier in the Northwest. Both this road and the Duluth & Iron Range are especially fortunate from the connected ownership of mines, road, ore ships and furnaces, for it permits an adjustment of difficulties all along the line and an adaptation to circumstances as they arise that are impossible elsewhere. Just now, for instance, Mountain Iron mine is forced to deliver to the railroad company an unpleasantly large block of Juniata ore, a grade of which not very much is wanted by Steel Corporation furnaces this year but of which they can make use if necessary. The mine must ship its Juniata, for the ore is in locations in the mine where it has to be gotten out of the way before other shipments can be made. If the railroad, mine and furnaces all belonged to separate interests neither mine nor furnace would give way and adapt itself. The road would have its cars and its dock pockets full of Juniata ore it could not get forward, and its traffic would suffer, or at best great inconvenience would result. Mountain Iron ships over the Duluth, Missabe & Northern road to United States Steel furnaces, and will produce about its usual total of 1,000,000 tons this year.

Louis W. Hill, vice president of the Great Northern road, in connection with a statement made two weeks ago that cars were short for ore at mines shipping on that road, tells me that there is no real inconvenience, and that stories of shortage are incorrect. He further says that the number of steel ore cars sent to the company's operations in Montana was less than the 500 which this correspondence noted.

The three big independent open pit mines of the Mesaba range, Stevenson, Mahoning and Biwabik, are now shipping an average of 21,500 tons daily, the first two over Great Northern and the third via Duluth & Iron Range road.

Big Cargoes by Lake Carriers.

The biggest great lakes cargo yet was loaded by the "Augustus B. Wolvin" at Escanaba, for the South Chicago docks of the Illinois Steel Company, a few days ago, consisting of 11,083.5 gross, or 12,413.5 net, tons of iron ore, bill of lading weight. The largest load ever carried out from any lake port by any other ship was 8807 gross tons on the "Wm. Edenborn," of the United States Steel Corporation fleet. The "Wolvin" drew 20 feet even keel on this trip, which is 1 foot more than can be figured on for the Lake Superior to Lake Erie run, where the Lime Kiln crossing governs the depth. Ore rates, Escanaba to South Chicago, by the way, have dropped 5 cents and are now 40 cents a gross ton, against 50 cents to Lake Erie ports. Deducting the unloading charge, this makes a net freight for the ship of 21 cents a gross ton. Last year the Pittsburgh Steamship Company put a 3500-ton ship in this trade. The freight was 50 cents a ton, with some costs slightly above the corresponding figures now; unloading charges, for instance, were 21 cents a ton, or 2 cents above this season. This ship's business was computed for nine consecutive trips and it was found that her actual costs were 52 cents a ton, showing a loss for the season of 2 cents a ton. This year a ship of that size would be seriously behind at the close of every trip. The distance from Escanaba to South Chicago, for which the ship gets the equivalent of 17 cents for a 2000-pound ton, is 280 miles, or 0.6 of 1 mill per ton per mile. This is getting transportation down to a pretty fine point.

Important Mining Interests.

H. S. Haselton, secretary and ore manager for Pickands, Mather & Co. of Cleveland, is in the mining region and will be at Duluth for some weeks inspecting the firm's properties. It owns Hemlock Mining Company, is interested with the Lackawanna Steel Company in the Verona Mining Company, operating on the Menominee and Gogebic ranges; owns the Crete, Hobart and Malta mining companies; is interested jointly with the Lackawanna Steel Company in the Scranton Mining Company, with Jos. Sellwood in the Cyprus, and operates the Sparta Mining Company—all on the Mesaba range. Hemlock will this year ship 125,000 tons, against 80,000 tons last season; Verona mine is permanently abandoned and after the present stock pile has been shipped will revert to its owners, but Baltic and Vivian, of the same company, will ship considerably more than last year. Mines of the Crete and Hobart companies are active, except for Troy, of the first named; Malta is being pumped out preliminary to mining; Sparta is shipping stock, and Scranton is idle for the season. The unfavorable conditions that still prevail in the iron trade are not underrated, and Mr. Haselton thinks they may continue until late in the year, but it is considered advisable to make fair shipments this year.

At the Spencer exploration, near Lake Fuma, Iron Mountain, a shaft will be driven a total depth of 110 feet; it is now down 70 feet in most encouraging ground. A considerable body of good ore was cut in the upper portion of this shaft. At the bottom cross cuts will be driven in the hope of intersecting the formation. This exploration is about 1000 feet from Cuff mine. Drills that have been working for Maas Bros., at Crystal Falls, will be moved to Iron Mountain vicinity and will be maintained in operation indefinitely there on lands belonging to the explorers.

Power for operations in the Calumet & Hecla copper mine is probably to be changed from steam to electric at an early day. The change, if adopted, will be one of the most important that has been undertaken. The wide radius of operations in the Calumet & Hecla necessitates the maintenance of many separate steam plants, large and small, and it is stated that the inquiry into a change has made prominent the fact that coal consumption at many of these plants is as high as 4 pounds per horse-power hour. It is proposed to erect at Torch Lake, where are its docks, mills and smelter, a central generating station that will supply all parts of the mine,

surface and underground, by overhead wire transmission. This mine makes considerable use of electricity now, both on surface and underground, but its steam power plant is the largest of its kind in existence, with units up to 8000 horse-power. The initial cost of transforming this system to electric will be enormous, but the Calumet & Hecla has never been noted for avoiding expense when it seemed advisable. D. E. W.

Pig Iron Production for the Half Year.

Through the courtesy of James M. Swank, general manager of the American Iron and Steel Association, Philadelphia, we are enabled to present the following statistics of pig iron production in the United States for the six months ended June 30, 1904:

Total production of pig iron, 8,173,438 gross tons. This production was divided as follows: Anthracite and coke, 622,803 tons; bituminous, 7,337,279 tons; charcoal alone, 213,356 tons. The Bessemer and low phosphorus iron made was 4,530,946 tons; basic, 1,061,901 tons; spiegeleisen and ferromanganese, 114,206 tons. Unsold stocks on the market June 30 were 623,254 tons. On June 30 216 furnaces were blowing.

The United States Steel Corporation's Quarterly Statement.

The directors of the United States Steel Corporation issued the quarterly statement of earnings after their regular meeting on July 26. The official statement is as follows:

Net Earnings.

April, 1904	$6,863,833	
May, 1904	6,256,518	
June, 1904	6,370,374	
Total net earnings after deducting, each month, the expenditures for ordinary repairs, renewals and maintenance of plants, also interest on bonds and charges of the subsidiary companies		$19,490,725
Less appropriations for the following purposes—viz.:		
Sinking fund on bonds of subsidiary companies	$469,525	
Depreciation and reserve funds	3,059,062	
		3,528,487
Balance		$15,962,238
Deduct:		
Interest on U. S. Steel Corporation bonds for the quarter	$5,867,175	
Sinking funds on U. S. Steel Corporation bonds for the quarter	1,012,500	
		6,879,675
Balance		$9,082,563
Dividend for the quarter on preferred stock of U. S. Steel Corporation, 1¾ per cent		6,304,919
Surplus for the quarter		$2,777,644

Unfilled Orders on Hand.

June 30, 1904	3,192,277 tons.
March 3, 1904	4,136,961 tons.

The unfilled orders on hand December 31, 1903, were 3,215,123 tons.

The net earnings of the Steel Corporation by quarters during the years 1902 and 1903, and as far as they have been reported in 1904, are as follows:

	1902.	1903.	1904.
First quarter	$26,715,457	$25,068,707	$14,500,000
Second quarter	37,662,058	36,642,308	19,490,725
Third quarter	36,945,488	32,422,955	.....
Fourth quarter	31,985,759	15,037,181	.....

In addition to declaring the regular quarterly dividend on the preferred stock, the directors elected Thomas Morrison of Pittsburgh to fill the vacancy in the board caused by the resignation of Charles M. Schwab.

Power Plant of the Chicago Drainage Canal.—The Sanitary District of Chicago, 1110 Security Building, Chicago, is planning the erection of a large water power plant at the southern terminus of the drainage canal near Lockport, Ill. The power plant will span the entire stream about two miles below the present controlling works, and will in a measure take the place of the controlling works in keeping a desired head of water in the canal. Two sluice ways or locks will be provided, one for the Illinois & Michigan Canal, and one for the large ship canal, should such canal be constructed. The Sanitary District is now advertising for bids on the following: Four turbine units, each on a horizontal shaft, each 6400 horse-power, at 34-foot head, 165 revolutions per minute; two units of turbines, each on a horizontal shaft, each 600 horse-power, at 34-foot head, 300 revolutions per minute; four 4000 kw. alternating, 60-cycle, three-phase, 2300-volt generators, one for each of the 6400 horse-power turbines; two 450 kw. direct current exciters of 125 volts. Each of the four large turbines will have three drafts or chambers, the whole unit being direct connected by a single shaft to the generator. From this generator the current will be stepped up from 2300 to 44,000 volts for transmission to Chicago. Provision is made for duplicating the turbine plant at such time as there is sufficient water supply to operate it. The present equipment will utilize all the water of the drainage canal when operated at eight-tenths gate. The power house itself will be a steel and cement structure, 160 x 360 feet, one story in hight. Bids on the turbines will be closed August 31. Specifications have not yet been issued for the generators, exciters and other equipment, nor for the building itself. This being city work, specifications will call for the 8-hour day in filling contracts.

MANUFACTURING.

Iron and Steel.

The firm of Walton & Macke, Kokomo, Ind., manufacturers of wire nail machines, has received a contract for a 30-ton wire nail plant from the Imperial Steel & Wire Company, Toronto, Ont., for its Collingwood plant.

According to advices from Marietta, Ohio, D. P. Torpy has been appointed trustee for the United Sheet & Tin Plate Company, which has plants at Marietta, Byesville, Newcomerstown, Canton and Newark.

Rear-Admiral Converse, Chief of the Bureau of Ordnance, Washington, has awarded contracts for about $1,000,000 worth of nickel steel gun forgings, dividing the award equally between the Bethlehem and Midvale companies. These two companies were the only bidders, and each bid 30 cents per pound.

The Andrews & Hitchcock Iron Company, operating the two Hubbard furnaces at Hubbard, Ohio, is installing a battery of four boilers each of 400 horse-power. These boilers are of the Stirling type and are being installed by the Stirling Boiler Company, Barberton, Ohio. Foundations are being built for the erection of eight more boilers of this type and of the same horse-power, which will be substituted for the present battery, which will be torn out. Only one of the two Hubbard furnaces is in blast, and it is probable that this will be blown out in a short time for relining and other repairs.

At the Duquesne Steel Works of the Carnegie Steel Company, at Duquesne, Pa., a contract for 50,000 tons of billets, sheet and tin bars has been finished for shipment to Welsh tin mills and English steel mills. This foreign business was secured by the United States Steel Exports Company, a subsidiary interest of the United States Steel Corporation.

The National Tube Company, Pittsburgh, is shipping from its National Works, at McKeesport, Pa., considerable tonnage of merchant sizes of pipe to South Africa and South America.

At a meeting of the stockholders of the Eastern Steel Company, Pottsville, Pa., on July 26, the capital stock was increased from $5,700,000 to $9,400,000. The company is extensively enlarging its plant.

The Meyersdale Sheet Steel Company, recently organized at Meyersdale, Pa., has elected the following officers: C. W. Truxal, president, Meyersdale; A. F. Baumgarten, vice-president, Pittsburgh; E. M. Beachley, secretary, Meyersdale; E. R. Floto, treasurer, Meyersdale, and T. J. Costello, general manager, Fairmont, W. Va. The work of removing the two-mill plant of the Huntington Tin & Planished Plate Company from Huntington, W. Va., to Meyersdale, which the new company has bought, has been started and is expected to be completed within two months.

This week repairs are being made to the Ohio Works of the Carnegie Steel Company, at Youngstown, Ohio, and the plant is closed. It is expected to resume operations next week. Two of the blast furnaces connected with this plant continue in operation.

The Mark Mfg. Company, Chicago, has recently started the third of the four furnaces at its Zanesville plant. The fourth furnace will be started in a few days. The three furnaces now running are working on iron and steel lap welded pipe, while the manufacture of boiler tubes is expected to be undertaken this

week. About 500 men are now employed, which force will be increased to 800 within a few weeks. New buildings aggregating 6000 square feet of floor space are being added to the plant.

The annual meeting of the stockholders of the Youngstown Iron & Steel Roofing Company was held in Youngstown, Ohio, last week, at which the following directors were elected: Lucius E. Cochran, Henry W. Heedy, Mason Evans, G. M. McKelvey and John O. Pew. The directors elected L. E. Cochran, president; G. M. McKelvey, vice-president; Mason Evans, treasurer; John O. Pew, general manager; Chauncey E. Cochran, secretary. This concern manufactures iron and steel roofing and siding, also black and galvanized iron and steel sheets, Youngstown corrugated expanded metal lath, Buckeye fire proof flooring and the Union metal corner bead. The company operates its own puddling and sheet mills and is prepared to furnish genuine puddled iron sheets.

General Machinery.

A new repair shop, 118 x 302 feet, is to be built at Newberry Junction, Pa., by the Philadelphia & Reading Railway, Reading.

The Lehigh Coal & Navigation Company will enlarge its foundry and machine shops at Lansford, Pa., by the erection of new buildings. New cranes will be operated by electricity, power for which will be supplied from a power house, also to be built. A locomotive house will be built and the car shops enlarged.

It is announced at Rutland, Vt., that the Rawson, Morrison Company, Cambridge, Mass., has purchased the business of the John A. Mead Mfg. Company, Rutland, Vt., which manufactures coal carrying machinery. The two concerns have been consolidated under the name of the Mead, Morrison Mfg. Company, with offices at Cambridge. The Rutland report states that the Mead Company did a business of $800,000 last year. Manufacturing consolidation, either at Rutland or in the vicinity of Boston, is said to be contemplated as an eventual result of the combination.

The Indianapolis Drop Forging Company, Indianapolis, Ind., whose plant was completely destroyed by fire on the night of the 18th inst., expects to rebuild and continue the business at once. The company is in the market for considerable new equipment.

The Champion Funding & Foundry Company, Burlington, Iowa, will be in the market shortly for a complete equipment for its new factory and foundry building, including three lathes, an engine and a complete complement of tools such as are required in an up to date foundry and machine shop.

The United Iron Works Company, Springfield, Mo., the organization of which was effected a year ago through the consolidation of the Crescent Iron Works and Sterling Iron Works, Springfield; the Aurora Foundry & Machine Works, Aurora, Mo., and Iola, Kan., and the purchase of the Pittsburg Foundry & Machine Company, Pittsburg, Kan., held its first annual meeting recently and declared a 4 per cent. dividend out of the earnings of the company on the capital stock of $650,000. At this meeting, also, new directors were chosen and the former officers of the company re-elected, as follows: C. H. Cole, president; H. T. Hornsby, vice-president and general manager; R. P. Bowyer, secretary; A. C. Daily, treasurer.

The Midland Mfg. Company, manufacturer of agricultural implements, Tarkio, Mo., will require a few drill presses, a bulldozer and planer for the new buildings which it is building.

Estimates are being received by the Autocar Company, Ardmore, Pa., for the erection of a new machine shop, plans for which were drawn by Lockwood, Greene & Co., Boston, Mass. The building will be of brick, three stories with basement, and 44 x 200 feet. The details of equipment have not yet been settled.

The Climax Mfg. Company, Corry, Pa., which was formerly owned by the late R. S. Battles, has been reorganized, with a paid in capital stock of $200,000, by the gentlemen who were formerly associated with Mr. Battles, and the business will be continued under the same management as heretofore. The following officers have been elected: L. W. Olds, president; C. W. Battles, vice-president; W. C. Kibler, secretary, and C. F. Webster, treasurer. The company makes tramway locomotives, logging cars, drilling and pumping engines, high speed engines, &c.

The Northern Pacific Railway is building new boiler shops at South Tacoma, which was formerly Edison, Wash. The principal building will be 116 x 300 feet, in which will be installed an electric transfer table 40 feet long and having a capacity of 125 tons. Details of machine tool equipment have not yet been settled. David Van Alstyne, mechanical superintendent, St. Paul, Minn., has the matter in charge.

Power Plant Equipment.

The Quartermaster, United States Military Academy, West Point, N. Y., will receive bids until August 9 for the construction of a boiler and mechanical draft plant.

The David Bradley Mfg. Company, Bradley, Ill., is considering the purchase of a battery of boilers, aggregating 500 horsepower, some time within the next 60 days.

The plant of the Model Gas Engine Company, Auburn, Ind., has been sold at auction to John W. White of Fort Wayne for $47,500. The debts against the company amount to $125,000, and the property invoiced at $92,000.

The Allentown Rolling Mills, Allentown, Pa., has booked a competitive order for a 10,000,000-gallon daily capacity pump for the city of Allentown's water department. The pump will be of the D'Auria pattern.

Power plant equipment and motors for operating the machinery are about the only new mechanical equipment which will be installed in the new plant of the D. & W. Fuse Company, Providence, R. I., when it is completed. The present machine tool equipment will be transferred to the new buildings, so that no purchases of machine tools are contemplated at this time. The power will be electric with motors driving main line shafting in each of the three rooms, there being in all seven 5 horsepower and one 25 horse-power motors. The generating equipment will comprise one 50-kw. direct connected, direct current, 500-volt generator, driven by high speed engine of 300 revolutions per minute, and one 15-kw. 125-volt direct current generator for lighting the factory. The switchboards will be equipped with double throw switches for throwing over on to the city circuits for overtime work. The boiler plant will consist of 100 horse-power of water tube boilers, either in one or two units, set separately so that they can be run independently for repairs and cleaning.

The Stirling Company, Chicago, was awarded the contract for installing four 350 horse-power wrought steel sectional boilers at the Boston Navy Yard.

Charles F. Sheriff, 910 Farmers' Bank Building, Pittsburgh, formerly of the Sheriff Machinery Company, has lately taken over the agencies for the Root water tube boiler, American Ball engine, Hardie-Tynes Corliss engine, Scranton steam pump and Charter gas engine.

Vice-Chancellor Garrison, at Trenton, N. J., has appointed Francis H. Stillman of New York and Frank P. McDermott of Jersey City temporary receivers for the Conover Mfg. Company, Jersey City. The company was engaged in the manufacture of steam condensers. The liabilities are $76,000, and nominal assets $99,000.

The Power Specialty Company, 126 Liberty street, New York, reports the following contracts closed for the installation of its well known Foster superheater, the contracts being of special interest as showing the increasing confidence in the use of superheated steam and also the variety of industries to which superheated steam is applicable: Laclede Power Company, St. Louis, Mo., two 500 horse-power; Columbian Improvement Company, Terre Haute, Ind., two 500 horse-power; Franklin Rubber Company, Boston, Mass. (separately fired), one 70 horsepower; Bradley-Ramsey Lumber Company, Lake Charles, La., one 100 horse-power; A. B. Wrisley & Co., Chicago, Ill., one 100 horse-power; H. F. Watson & Co., Erie, Pa., one 80 horse-power; Samuel Horner, Jr., Riverside, Ky. (separately fired), one 340 horse-power; Belt Light & Power Company, Lead, S. D., one 200 horse-power; Milwaukee Electric Railway & Light Company, Milwaukee, Wis., five 500 horse-power; Philadelphia, Coatesville & Lancaster Railway Company, Philadelphia, Pa., three 300 horse-power.

Foundries.

The present equipment of the Ensign Foundry Company, Toledo, Ohio, will be transferred to its new shop, but in addition there will be required a jib crane, Root or Connersville blowers and possibly two more rattlers. Some of the equipment has been purchased, but more will be needed later on. The new foundry, the foundations for which have just been completed, will be 80 x 164 feet, part one and one-half and part two stories.

The Blakeslee Foundry Company, Cleveland, Ohio, has incorporated as the Blakeslee Foundry & Forging Company, with a capital stock of $150,000.

The annual meeting of the stockholders of the Sharon Foundry Company, at Wheatland, Pa., was held last week. The report of operations for the past year was very satisfactory. Joseph Riddell was re-elected president and Thomas Kennedy secretary and treasurer.

The Adrian Steel Casting Company, Adrian, Mich., has been organized with a capital stock of $30,000, to make castings under the process of A. H. Davies of Cleveland, Ohio. For information communicate with W. N. Swift, secretary and general manager. Charles E. Sutton of Toledo, Ohio, is president; G. B. Seager, vice-president, and E. N. Smith, treasurer.

Bridges and Buildings.

John V. Schaefer, Jr., building construction, 9-13 East Fifty-ninth street, New York, is receiving estimates on the iron work for the two large halls he is erecting at Ithaca, N. Y., for Cornell University.

Information about "saw tooth" type and other iron construction of buildings with cement or similar fire proof floors is desired by the Williamson Veneer Company, Baltimore, Md., which is to rebuild its plant, which was recently destroyed by fire. The new building will be 70 x 170 feet, one story high, and is to be of modern fire proof construction. The matter of equipment has not yet been determined.

O. O. Alexander, Kansas City, Mo., has secured the contract for erecting a steel bridge across the South Canadian River at Taloga, Okla. Mr. Alexander's bid was $18,990. The river measures 1282 feet across at the point where the bridge will be located.

The Indiana Bridge Company, Muncie, Ind., has been awarded the contract for the erection of a steel bridge across White River at Bloomfield, Ind.

The Paris Bridge Company is successor to the Paris Bridge & Supply Company, Paris, Ill. This company handles structural steel for bridge work, road making machinery, sewer and culvert pipe, steel arches and culverts. G. E. Zimmerly is president.

Fires.

The plant of the Chester Steel Casting Company, Chester, Pa., was damaged $10,000 by fire last week.

The Robert Burns Foundry, Brooklyn, N. Y., suffered an $8000 loss by fire on July 21.

The factory of the Rattan Mfg. Company, at New Haven, Conn., was destroyed by fire July 20. The estimated loss of $25,000 is covered by insurance.

The shop of the Shuman Machine Company was damaged to the extent of $3500 in a serious blaze at Rockland, Maine, July 20.

Hardware.

The Colonial File Company, Boston, Mass., has applied for a building permit for a new factory at Dorchester. The building will be of wood, 30 x 140 feet, and one story. The company has nearly 24,000 square feet of land for a site.

George F. Whiting, formerly superintendent of the American Axe Company's plant at East Douglass, Mass., has leased the C. A. Williams factory at Skowhegan, Me., and will manufacture a general line of edge tools, making a specialty of lumbermen's wedge axes.

The Booth Mfg. Company, Bristol, Conn., manufacturer of brass hardware, has sold its business to the Cheshire Novelty Company, Cheshire, Conn.

The Simonds Mfg. Company, Fitchburg, Mass., has broken ground for an addition to its factory, 60 x 165 feet, three stories high; also a new power house, 40 x 94 feet, which will be furnished with equipment of the latest type. These additions were made necessary by the growth of the business in the Simonds line of saws and particularly to afford more room for the band saw department.

I. E. Palmer, Middletown, Conn., manufacturer of hammocks will build an addition to his factory, 35 x 50 feet, four stories, to increase the general manufacturing facilities of the business.

The Charles S. Davis Company, New Haven, Conn., has been incorporated as a selling company to handle the Phillips pressed steel pulleys, manufactured by the Phillips Pressed Steel Pulley Company of Philadelphia.

The Dupont Powder Company announces that it will permanently close its mills at Hazardville, Conn., in September. The company finds that it can manufacture powder cheaper at its other plants than at Hazardville. The Hazardville powder industry was established in 1835. The manufacture of blasting powder was discontinued at this plant in January, sporting powder being the only product at the present time.

The Mallory Mfg Company, Flemington, N. J., has within a short time opened an agency at Bombay, India, for the sale of its shutter workers. The company is also doing a considerable trade with Porto Rico, the exposed parts of the device for that country being of bronze to withstand the climate.

Miscellaneous.

The Foreman Can Company, Irwin, Pa., will take up the manufacture of stamping of sheet metal work of all kinds, having installed a special machine for turning out large screw work.

The Tacoma Smelting Company, Tacoma, Wash., has not yet completed plans for its proposed new electrolytic copper refinery, and with the exception of two motor generator sets purchased from the Westinghouse Electrical & Mfg. Company, none of the equipment for the new plant has been secured. The induction motor in each set is 435 horse-power and the direct current generated will be 150 volts. The plant, which is expected to be in operation by next March, will have an initial capacity of 25 tons of refined copper per day.

None of the engines, boilers or machinery were damaged materially in the recent fire at the plant of the New Jersey Zinc Company on the Hackensack Meadows. The damage amounted to little and was almost entirely confined to the boiler house.

The Universal Electric Supply Company has been incorporated, with offices at 353 Dearborn street, Chicago, to conduct a jobbing business in electrical supplies. The company is Western distributer for the Brilliant Electric Company, Cleveland, Ohio, who make the Universal tipless incandescent lamps, and also for the Imperial Electric Mfg. Company, New York, manufacturers of the Imperial arc lamp. F. C. Royal is president of the new company and F. B. Kavanagh secretary and treasurer.

P. P. Mast & Co., makers of agricultural implements, Springfield, Ohio, have purchased the manufacturing business of the Fountain City Drill Company, of La Crosse, Wis. Mast & Co. will manufacture the Fountain City machines at their plant in Springfield, adding the Northwestern territory, which has heretofore been worked by the Fountain City Drill Company, to their territory; that is, working it direct and taking over the Fountain City Drill Company's force of traveling men.

The Racine Boat Company, Muskegon, Mich., is breaking ground for its new foundry, 60 x 120 feet, together with annex for brass foundry, 25 x 50 feet. The building will be equipped with machinery used in the company's old plant at Racine, Wis. The company also contemplates the building of a two-story storage warehouse, 80 x 280 feet. This latter structure the company will build itself, buying the necessary material.

The Pittsburgh Gas Stove & Mfg. Company, Pittsburgh, Pa., has been chartered at Harrisburg, Pa., with a capital stock of $24,000. Edward J. Dashbach, Carrick, Pa., is a director.

The Reeves Mfg. Company, New Haven, Conn., is to begin the manufacture of gas meters in addition to its automatic attachment for meters. The company has taken another floor in the building occupied by the business, which will give 5000 square feet of additional floor space. The authorized capital stock of the company, which is a Connecticut corporation, has been increased from $50,000 to $250,000, additional capital being necessary for the extension of the business.

Iron and Industrial Stocks.

The week was characterized by much greater activity in the iron and steel stocks. Under the leadership of United States Steel prices steadily advanced with heavy transactions until Monday of this week, when the climax of the present movement occurred. The range of prices during this somewhat excited period was as follows: Colorado Fuel, 35 to 37¼; Republic Iron & Steel preferred, 42¾ to 46; Sloss-Sheffield common, 37½ to 39½; Tennessee Coal, 39⅝ to 44¾; United States Steel common 11⅞ to 12¾, preferred 61⅜ to 63½, and the new 5's 78¼ to 79⅝. Prices slowed off to some extent on Monday, but declined still further on Tuesday, the recessions running from $2 to $3 per share. Last transactions up to 1.30 p. m. on Wednesday in active stock were made at the following prices: Can preferred, 41⅛; Car & Foundry common 18½, preferred 78½; Locomotive common 20½, preferred 86½; Colorado, 35; Pressed Steel common 33, preferred 76½; Railway Spring common 20, preferred 75¼; Republic common 7⅝, preferred 42½; Sloss-Sheffield common 37, preferred 85; Tennessee, 42; United States Steel common 11⅜, preferred 59½, new 5's 78.

The consolidated profit and loss account of the General Electric Company, January 31 to May 31, 1904, shows: Surplus January 31, 1904, $7,293,688.75; sales, $12,028,568.42; royalties and sundry profits, $19,753.71; interest, dividends and discount, $172,678.68. Total, $19,514,689.56. Cost of manufacturing and selling, $9,741,302.87; interest on debentures, $25,268.29; dividends paid, $877,334; profit and loss, May 31, 1904, $8,870,784.40. Total, $19,514,689.56. The consolidated balance sheet as of May 31, 1904, shows: Assets—Patents and good-will, $2,000,000; factory plants, $7,177,318.86; stocks, bonds and real estate other than factories, $15,390,587.54; cash, $2,650,381.61; notes and accounts, $16,576,044.04; work in progress, $1,830,880.83; inventories, $11,547,736.30. Total, $57,172,949.18. Liabilities—Common stock, $43,869,100; 5 per cent. debentures, $79,000; 3½ per cent. debentures, $2,049,400; accounts payable, $2,304,664.78; profit and loss—surplus, $8,870,784.40. Total, $57,172,949.18.

Announcement was made on Friday by Kuhn, Loeb & Co., New York, that the $4,000,000 Westinghouse Electric & Mfg. Company's three-year 5 per cent. notes, recently negotiated by that company, have all been sold. These notes are indorsed by the Security Investment Company, Pittsburgh, and are further secured by a deposit of $4,000,000 Lackawanna & Wyoming Valley Rapid Transit first lien and consolidated mortgage 5 per cent. bonds, and such an amount of the assenting stock of the Westinghouse Electric & Mfg. Company that the aggregate market value of such stock shall be at all times at least $2,000,000. Of the notes 25 per cent. has been proportioned to New England. A circular is to be sent to stockholders before August 1, explaining the sale of notes, which is connected with the issuance of the remaining 50,000 shares of treasury stock, of which 37,500 shares have been underwritten at $80 per share (par value $50). The money is required for the extension of the company's business and to cover recent investments in the British Westinghouse Company.

Dividends.—United States Steel Corporation has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable August 30.

Rathbone, Sard & Co., Albany, N. Y., have declared quarterly dividends of 1¾ per cent. on the preferred and 1½ per cent. on the common stock, both payable August 1.

The Page Woven Wire Fence Company, Monessen, Pa., has declared a semiannual dividend of 2½ per cent., payable August 1.

American Steel Foundries have declared a quarterly dividend of 1 per cent. on the preferred stock, payable August 1. This is a reduction of ½ per cent. from the previous dividend, paid in May last.

Cambria Steel Company has declared the regular quarterly dividend of 1½ per cent., payable August 15.

The Iron and Metal Trades

A good many of those who are watching developments in the Iron trade do not seem to get down to the heart of the matter, and that is whether or not consumption is expanding, and if so, to what extent. To begin with, it is only now freely admitted how wretched the situation was during the past few months, and how much is needed to restore us to normal conditions. Now, as a matter of fact, there has been only a very moderate increase in the current tonnage output of Finished Iron and Steel, all the flourish of starting mills which have been temporarily idle for repairs to the contrary notwithstanding. As yet, what is much more important, specifications on orders are only in some lines taking the place of shipments disposed of, or a little better. Nor do some of the great leaders in the industry expect much improvement in the consumption during the current quarter.

Yet the feeling is better throughout the whole industry, and that, we take it, is based upon the hopes engendered by the greater facility with which new projects may be financed. Inquiries three months since for material from promoters of new enterprises aroused little interest, unless the cash was in sight—an exceedingly rare occurrence then. Now the schemes come in much better form, but it takes an enormous tonnage to keep the plants running, even at the present diminished rate.

The reports of the tonnage on the books of the United States Steel Corporation must not be taken too literally. We doubt whether even 100,000 tons as a unit is quite reliable, in the nature of the case. They possess some value as the basis of comparison, always assuming that the outsiders keep getting the same share of the whole. The report of orders on hand may reflect the temperament of the buyers rather than the volume of business or consumption, and it is possible that we entered the third quarter running at a better rate than we did the second quarter, in spite of a falling off in orders of nearly a million tons according to the record.

There have not been any particularly interesting developments during the week. The Eastern Pig Iron trade has shown some weakness, in spite of the fact that the Southern makers are holding at higher figures. In the West the Southern producers have practically surrendered the market to their Northern rivals in the whole territory north of Cincinnati and east of Indianapolis.

Pittsburgh reports that sellers are demanding more money, and in some cases are getting it, for pretty round lots.

Ordinarily the argument on the part of a manufacturer that he has reached or even has passed cost is not a very effective one with the buyer, who has heard the cry of wolf too often, but at the present time the actions of makers of Pig Iron speak quite emphatically and bear him out.

There is no really good buying movement in any branch of the Iron industry. A fair tonnage is coming out, and it is in some lines rather better than it has been.

It is, of course, yet too early to judge what effect the new antidumping policy of our Northern neighbors is likely to have on our export trade. Shipments are being rushed on all orders taken prior to June 7, so as to get deliveries through before August 31. After the latter date we will learn just how the new method will be applied.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	July27, 1904.	July20, 1904.	June29, 1904.	July 29, 1903.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$14.25*	$14.25	$14.50	$17.75
Foundry Pig No. 2, Southern, Cincinnati	**12.00**	11.75	11.75	15.25
Foundry Pig No. 2, Local, Chicago	13.25	13.25	13.25	17.25
Bessemer Pig, Pittsburgh	12.50	12.50	12.50	18.85
Gray Forge, Pittsburgh	*11.85*	11.85	12.10	16.50
Lake Superior Charcoal, Chicago	14.50	14.50	14.50	21.50
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	23.00	23.00	23.00	27.00
Steel Billets, Philadelphia	24.00	24.00	24.00	28.25
Steel Billets, Chicago	*22.00*	22.00	24.00	28.00
Wire Rods, Pittsburgh	*28.00*	28.00	28.50	35.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	**10.00**	9.50	9.50	17.00
O. Steel Rails, Philadelphia	**11.50**	11.00	11.00	18.75
O. Iron Rails, Chicago	14.50	14.00	14.50	18.50
O. Iron Rails, Philadelphia	*13.75*	13.75	14.50	20.50
O. Car Wheels, Chicago	**11.00**	10.50	10.50	21.50
O. Car Wheels, Philadelphia	*10.50*	10.50	11.00	20.50
Heavy Steel Scrap, Pittsburgh	11.00	10.50	11.00	19.00
Heavy Steel Scrap, Chicago	9.00	9.00	9.00	15.50
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.48½	1.48½	1.48½	1.65
Common Iron Bars, Chicago	1.30	1.30	1.30	1.65
Common Iron Bars, Pittsburgh	1.30	1.30	1.30	1.65
Steel Bars, Tidewater	1.49½	1.49½	1.49½	1.70
Steel Bars, Pittsburgh	1.35	1.35	1.35	1.60
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.78
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.74½	1.74½	1.74½	1.73½
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.73½
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Steel, Pittsburgh	1.32½	1.32½	1.35	1.85
Skelp, Sheared Steel, Pittsburgh	1.32½	1.32½	1.35	1.90
Sheets, No. 27, Pittsburgh	2.00	2.00	2.00	2.60
Barb Wire, f.o.b. Pittsburgh	*2.45*	2.50	2.50	2.60
Wire Nails, f.o.b. Pittsburgh	*1.85*	1.90	1.90	2.00
Cut Nails, f.o.b. Pittsburgh	*1.65*	1.75	1.75	2.15
METALS:				
Copper, New York	12.62½	12.62½	12.62½	13.00
Spelter, St. Louis	**4.75**	4.77	4.70	5.50
Lead, New York	*4.10*	4.20	4.20	4.12½
Lead, St. Louis	*4.00*	4.12½	4.12½	4.20
Tin, New York	**26.87½**	26.40	25.50	28.60
Antimony, Hallett, New York	7.25	7.25	7.25	6.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	*3.49*	3.64	3.64	3.99

Chicago.

FISHER BUILDING, July 27, 1904.—(*By Telegraph.*)

A better tone pervaded the market at large, and demand for Finished Iron and Steel both from mill and from store has increased each week since the first week in July, which marked the low point thus far for 1904. The strike at the stockyards in Chicago and other packing centers has served to retard the betterment of conditions to some extent, although it has not yet been sufficiently marked to stop the upward course of business. Pig Iron conditions are unchanged since last week, except that sellers have become more and more unwilling to meet the wishes of buyers in respect to forward deliveries at current prices. Some little increase is shown in business booked by car works, and as a consequence Bars, Structural Material and Sheets and other goods entering into the construction of freight cars have received some impetus. This is particularly true of Bars, Angles and Channels. Nothing new has developed in Billets or Rails, and business is extremely quiet in both. The Plate situation has improved, and a number of 1000-ton orders have been placed during the week under review, presumably at association prices. The Sheet business is badly demoralized, and prices are so low that they cannot well go lower. The Inland Steel Company, at Indiana Harbor, has withdrawn from the Sheet market indefinitely, closing down its Sheet mills. This also applies to its Light Plates. Tubular goods show some improvement in demand. Cast Pipe is quiet, but some good tonnages are being figured on. Old Materials are advancing under the stress of speculative buying, although actual consumers are holding aloof, refusing to participate in the scramble. Speculation has been stimulated by the attitude of some of the leading railroads, which are withholding materials from the market, at the same time giving bidders to understand that some one else secured the goods because of higher bids. The demand for Coke has

shown no improvement, and prices are very weak. Pig Tin shows a slight advance, and Pig Lead a slight decline. Wire Nails and other Wire products are in rather better demand, and prospects are good.

Pig Iron.—There is a slightly better tone to the Pig Iron market, but the actual buying has not greatly increased. The deadlock between buyers and sellers is now a matter of delivery rather than price, buyers holding off for long term deliveries at present prices and sellers asking premiums of from 25c. to 50c. per ton for deliveries extending into the fourth quarter of this year and beyond. The Coal miners' strike in the Southern fields is still on, and considerably less Coal is being produced than is sufficient to supply the Alabama and Tennessee Coke Ovens. What will happen as soon as the surplus Coal stocks at the ovens are consumed and the demand exceeds the supply is easy to guess, although the strike may be terminated before that time is reached. Southern furnaces are not disposed to fill up with low priced Iron at present prices, and a good deal of business is being done on the basis of $9.50 for No. 2 for delivery in the fourth quarter; $9.25 is only available for prompt shipment. The market in Northern Irons has been quiet, and the record of the week previous has not been maintained by the present week. Prices, however, are quite firm, as the furnaces are seemingly content to wait until buyers are willing to pay prices for extended deliveries that vouchsafe to the furnaces at least a portion of the increase in price which is expected. Sales of 1000-ton lots of both Northern and Southern Iron are not infrequent, but in the majority of cases those who buy lots of this size are accustomed to buy in still larger quantities. We make no changes in our price-list, and believe it only just to explain to our readers that the minimum prices named are, for the most part, available only for shipment during the present quarter, the higher prices prevailing for fouth-quarter delivery. We quote:

Lake Superior Charcoal	$14.50 to $15.50
Northern Coke Foundry, No. 1	13.75 to 14.00
Northern Coke Foundry, No. 2	13.25 to 13.50
Northern Coke Foundry, No. 3	13.00 to 13.25
Northern Scotch, No. 1	13.75 to 14.00
Ohio Strong Softeners, No. 1	14.55 to 14.80
Ohio Strong Softeners, No. 2	14.05 to 14.55
Southern Silvery, according to Silicon	14.15 to 15.15
Southern Coke, No. 1	13.40 to 13.65
Southern Coke, No. 2	12.90 to 13.15
Southern Coke, No. 3	12.65 to 12.90
Southern Coke, No. 4	11.90 to 12.15
Southern Coke, No. 1 Soft	13.40 to 13.65
Southern Coke, No. 2 Soft	12.90 to 13.15
Southern Gray Forge	11.90 to 12.15
Southern Mottled and White	11.65 to 11.90
Malleable Bessemer	13.75 to 14.00
Standard Bessemer	14.25 to 14.75
Jackson County and Kentucky Silvery, 6 to 10 per cent. Silicon	16.30 to 18.30
Alabama Basic	.... to 13.15
Virginia Basic	13.85 to 14.10

Billets.—The market is quiet and no sales of any magnitude have developed. It is pretty generally understood that the sale chronicled two weeks ago and referred to last week of 1500 tons of Axle Billets was made at about $22, delivered to the works of the company just outside Chicago city limits, and, if this is the case, it is a reduction of $3 per ton below the pool prices, as Car Axle Billets, 25 to 40 per cent. carbon, carry an extra of $1 per ton above the ordinary Billets. The pool price may be considered as purely nominal, and few, if any, buyers can be forced to pay this price. Pool price is $24 per gross ton, Chicago, for Billets 4 x 4 and larger, for either Open Hearth or Bessemer, for forging or rolling purposes, with extras for smaller sizes and extras for high carbon analysis.

Rails and Track Supplies.—The leading producers here positively deny the statements published widely in the daily papers of large sales made, and explain that in all likelihood the erroneous reports found their origin in the fact that some roads have been specifying rather heavily on old contracts. They state that as a matter of fact almost no new business has been done from either steam or electric roads during the last six days and that the Rail business is extremely quiet. Standard Sections are unchanged on the $28 basis, and Light Sections range from $22 to $25 per gross ton. Angle Bars are unchanged at 1.35c. to 1.40c. Spikes are now quoted at 1.65c. to 1.70c. in car lots from mill and as high as 1.85c. in small lots from store. Track Bolts are selling at 2.20c. to 2.25c., base, from mill, with Square Nuts, and 10c. to 15c. extra for Hexagon Nuts, with an advance of about 15c. for shipment from store.

Structural Material.—Little business of any moment has developed during the week under review in this line, although there are quite a number of contracts of considerable magnitude that are being held in abeyance. Pick up business shows some improvement. Prices are unchanged, as follows: Beams and Channels up to and including 15 inches and Angles 3 inches on one leg and larger, 1.76½c., Chicago; Tees, $1 per ton extra. Store prices on Structurals are as follows: Angles, Beams, Channels and Zees, base sizes, 2c. to 2.10c.; Tees, 2.05c. to 2.15c., either random lengths or cut to lengths 5 feet and over.

Plates.—A decided improvement in the demand for Plates is noted on every side, both from mill and from store, and as a consequence the few leading independent producers of Plates are apparently satisfied with a cut of $1 to $2 a ton, instead of cutting $3 to $4 a ton, as they have done in the past. Association prices are being held very generally by mills in the association, as follows: 1.60c., Pittsburgh, for ¼ inch and heavier, 1.70c. for 3-16 inch, 1.75c. for No. 8, 1.85c. for No. 9. Store price on all gauges from No. 10 to the heaviest is 2c. to 2.10c., f.o.b. warehouse, with the usual extras for wide widths and special qualities.

Sheets.—Prices on Sheets have gone so low that they represent an actual loss to most of the mills, and it is not likely that lower prices will be seen in the future than those now prevailing. Should the leading producer conclude to advance prices there would no doubt be a general scramble on the part of the buying public to get under cover, and independents would be only too glad to join in any movement looking toward profit making prices. The Inland Steel Company's Sheet mill at Indiana Harbor is closed indefinitely owing to a refusal on the part of the company to sign the Amalgamated scale and to the fact that it prefers to stay out of the market rather than to continue to sell at the low prices prevailing. The time is ripe for an advance in Sheets, and buyers are not likely to make an error in making long time contracts at present figures, provided they can induce mills to accept business for extended delivery. We repeat last week's quotations without change: One Pass Cold Rolled Blue Annealed, Nos. 9 and 10, 1.76½c.; Nos. 11 and 12, 1.86½c.; Nos. 13 and 14, 1.91½c.; Nos. 15 and 16, 2.01½c.; Nos. 18 to 20, 2.01½c. to 2.06½c.; Nos. 22 to 24, 2.06½c. to 2.11½c.; No. 26, 2.11½c. to 2.16½c.; No. 27, 2.16½c. to 2.21½c.; No. 28, 2.26½c. to 2.31½c.; No. 29, 2.41½c. to 2.46½c.; No. 30, 2.51½c. to 2.56½c. Store prices on Sheets are unchanged, as follows: No. 10 and heavier, 2c. to 2.10c.; No. 12, 2.05c. to 2.15c.; No. 14, 2.10c. to 2.20c.; No. 16, 2.20c. to 2.30c.; No. 18, 2.30c. to 2.40c.; No. 20, 2.30c. to 2.40c.; No. 22, 2.35c. to 2.45c.; No. 24, 2.40c. to 2.50c.; No. 26, 2.50c. to 2.60c.; No. 27, 2.60c. to 2.70c.; No. 28, 2.70c. to 2.80c.; No. 29, 2.85c. to 2.95c. Local trade in Galvanized Sheets is suffering somewhat from the strike in the stockyards, as the packers are very large users of this commodity. Galvanized Sheets are extremely weak, the ruling discounts being 80 and 5 to 80 and 10, Pittsburgh, for carload shipments from mill, and 75, 10 and 5 to 80 per cent. discount for smaller lots from store, Chicago.

Bars.—Bar Iron is none too strong at 1.30c. to 1.35c., Chicago, in carload lots, although sellers show orders at the higher price from close buyers. Demand, on the other hand, has increased somewhat, and the general feeling in the trade is better. Two car works have ordered materials for an aggregate of 2000 cars. Steel Bars are still offered by the International Harvester Company at from 1.40c. down to a point where they compete with Iron Bars. The association price on Steel Bars remains unchanged at 1.35c., Pittsburgh, or 1.51½c., base, half extras, Chicago. Hoops have suffered greatly from the packers' strike, as a large number of coopers' shops who depend entirely on stockyards work have received orders to curtail their output greatly. Prices are unchanged, nominally at least, at 1.71½c. rate, full extras. Store prices are as follows: Iron Bars, 1.70c. to 1.75c., base, full extras; Steel Bars, 1.70c. to 1.75c., base, half extras; Hoops, 2.10c. rates, full extras.

Merchant Steel.—Approximately, 50 per cent. of the tonnage required by agricultural implement manufacturers has been contracted for delivery up to July 1, 1905, though there are still a number of buyers who are delaying the completion of their contracts, notwithstanding the fact that it is possible to make contracts with all producers of this class of goods fully guaranteeing buyers against reductions in price. The Shafting Association made no change in its prices. Official prices on Merchant Steel are as follows: Open Hearth Spring Steel to the general trade, 1.90c. to 2.10c.; Smooth Finished Machinery Steel, 1.76½c. to 1.81½c.; Smooth Finished Tire, 1.71½c. to 1.76½c.; Sleigh Shoe, flat, 1.56½c. to 1.61½c.; Sleigh Shoe, concave and convex, 1.66½c. to 1.71½c.; Cutter Shoe, 2.25c. to 2.35c.; Toe Calk Steel, 2.06½c. to 2.11½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots.

Merchant Pipe.—Pipe makers have not in the least receded from their attitude of expecting a large season's business, and their actual current business seems to uphold their optimistic view of the future. The following discounts are for carload lots, Chicago:

	Steel Pipe. Black.	Steel Pipe. Galv.	Guar. Wr'ght Iron. Black.	Guar. Wr'ght Iron. Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛ to ⅜ inch	68.35	53.35	67.35	52.35
½ inch	71.35	61.35	70.35	60.35
¾ to 3 inches	76.85	66.85	75.85	65.85
3½ to 6 inches	75.35	65.35	74.35	64.35
7 to 12 inches	70.85	55.35	69.85	54.35

Boiler Tubes.—Demand for Boiler Tubes has increased somewhat, and producers are stated to be holding firmly to

the association discounts. These discounts for less than carload lots, Chicago, are as follows:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches	46.35	41.35	52.35
1¾ to 2¼ inches	58.35	41.35	40.35
2½ inches	60.35	46.35	43.35
2¾ to 5 inches	66.35	53.35	up to 4 in. 50.85
6 to 13 inches	58.35	41.35	....

Carload buyers are given two points better discounts than the above. Demand for Boiler Tubes from store has increased nicely, and prices are being strictly adhered to as far as can be ascertained, as follows:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches	42½	37½	40
1¾ to 2½ inches	52½	35	37½
2½ inches	55	37½	40
2¾ to 5 inches	62½	47½	47½
6 inches and larger	52½	35	..

Cast Iron Pipe.—A few small lots have been placed during the week under review, but none of any consequence, and business may be said to be quiet. Prices are unchanged: $25.50 the maximum for 4-inch Water Pipe and $24.50 for 6-inch and heavier, and $1 extra for Gas Pipe. Better prices than these will be named on lots of several hundred tons and above.

Old Materials.—While the actual consumers of Old Materials are buying but little, and are in a position where they will not have to buy large quantities for some time, prices are steadily rising under the influence of speculative buying. In one case an advance made during the last week was as much as $1 a ton, and it is possible that even our present prices are low as compared with figures obtained by railroads from speculators. A contributory influence in this connection is the fact that many railroads are withholding their Materials from the market altogether. What will happen when these roads conclude to market their accumulation depends upon conditions at that time, but as matters look now actual users of Scrap will be able to buy later on more cheaply than they can at the present moment. The Chicago, Milwaukee & St. Paul is offering about 3500 tons this week, and this is the only list thus far promulgated. We advance Iron Car Axles $1 per ton; Heavy Cast Scrap, 75c.; Old Iron Rails, short lengths Steel Rails, Old Car Wheels, Iron Fish Plates, Steel Car Axles, 50c. per ton; Old Steel Rails, long lengths, No. 2 Railroad Wrought, Iron and Steel Axle Turnings, Machine Shop Turnings and Stove Plate, 25c. per ton. The following prices are per gross ton, Chicago:

Old Iron Rails	$14.50 to $15.00
Old Steel Rails, 4 feet and over	10.75 to 11.25
Old Steel Rails, less than 4 feet	10.00 to 10.50
Heavy Relaying Rails, subject to inspection	21.00 to 22.00
Heavy Relaying Rails, for side tracks	18.00 to 20.00
Old Car Wheels	11.00 to 11.50
Heavy Melting Steel Scrap	9.00 to 9.50
Mixed Steel	8.00 to 8.50

The following quotations are per net ton:

Iron Fish Plates	$12.50 to $13.00
Iron Car Axles	15.00 to 15.50
Steel Car Axles	13.50 to 14.00
No. 1 Railroad Wrought	10.50 to 11.00
No. 2 Railroad Wrought	9.50 to 10.00
Shafting	12.50 to 13.00
No. 1 Dealers' Forge	8.50 to 9.00
Wrought Pipes and Flues	7.25 to 7.50
Iron Axle Turnings	7.00 to 7.50
Soft Steel Axle Turnings	7.00 to 7.50
Machine Shop Turnings	6.50 to 6.75
Cast Borings	3.50 to 4.00
Mixed Borings, &c	3.50 to 4.00
No. 1 Mill	6.00 to 6.50
Country Sheet	4.50 to 5.00
No. 1 Boilers, cut to Sheets and Rings	7.00 to 7.50
Heavy Cast Scrap	9.50 to 10.00
Stove Plate and Light Cast Scrap	7.75 to 8.25
Railroad Malleable	8.25 to 8.75
Agricultural Malleable	7.75 to 8.00

Metals.—Pig Tin has advanced another ½c. Pig Lead has lost 1-10c. per lb. Otherwise last week's prices prevail. The present market is as follows: Copper is unchanged in price, Casting being held at 12¾c. and Lake at 13c. Pig Tin is now quoted at 28c. to 28¼c. Pig Lead is quoted at 4.20c. for 50-ton lots, 4.10c. to 4.20c. for car lots and 4.40c. for less than car lots. Spelter is sold at 4.80c. to 4.90c. for car lots and 5.10c. to 5.25c. for small lots. Sheet Zinc is 6c. for car lots of 600-lb. casks and 6.25c. to 6.30c. for less than car lots. Old Metals are as follows: Copper Wire and Heavy, 11c. to 11⅛c.; Copper Bottoms, 9¾c.; Copper Clips, 11c. to 11⅛c.; Red Brass, 9¾c.; Red Brass Borings, 8c.; Yellow Brass, Heavy, 7¾c.; Yellow Brass Borings, 6½c.; Light Brass, 5⅞c.; Tea Lead, 4c.; Zinc, 4.25c.; Pewter, No. 1, 17½c.; Block Tin Pipe, 22½c.

Coke.—Notwithstanding the evident increase in purchases of Foundry Iron, the Coke business is still in the dumps, with little or nothing doing; $1.75 to $1.90 per ton, f.o.b. Connellsville ovens, seems to be the going price for Foundry Coke, with prices a shade lower at Virginia and West Virginia ovens. Freight from Connellsville, Pocahontas and New River regions, $2.65 per ton; from Sage County, Va., ovens, $2.25 per ton.

Philadelphia.

FORREST BUILDING, July 26, 1904.

The feeling in the Iron trade is better than it has been during the last three or four weeks, but conditions are unchanged in all the essential features. The numerous inquiries for Pig Iron noted in the last week's article have brought some business, and, as a consequence, sellers and producers are more cheerful. This, however, is due more to the change from almost no business to a little business and a willingness to consider whether it is safe or not to make more extended engagements. Looking into this phase of the situation, there is really very little ground for believing that anything has been occurring to change the general outlook. As we said before, there has been more buying, and there must be some more buying right along. The business of the country cannot stand still, but, for perfectly natural reasons, it has slowed down considerably, and the time for permanently increased activity is not yet. It is not necessary to consider the why and the wherefore, as these matters are well understood. At this time it is difficult to say just how much Pig Iron will be sufficient to meet requirements during the remainder of the year, but there appears to be no reason for changing the estimates made several weeks ago. The demand may run a little better for a few weeks, or a little worse for some, but there is no reason to suppose that more than 5,000,000 tons of Pig Iron will be required during the last five months of the year, and if more than that is produced, so much the worse for prices. As regards the latter, they are easier, not distinctly lower, but the tendency is lower. Bids that would have been turned down or held for advisement two or three weeks ago would be promptly accepted to-day, which is good evidence of the trend of the market. In the more advanced products similar conditions are met with, except in articles that are held by price agreements. Prices have a weak undertone, the demand is disappointing, and for the present there is little or no prospect of improvement. On the whole, therefore, while there is a slightly better feeling, due to a somewhat better demand, it would probably be premature to say that things are better, or that underlying conditions are in any respect different to what they have been for some time past.

Pig Iron.—There has been a better demand for Pig Iron, due chiefly to the exhaustion of stocks in consumers' yards. The tonnage has not been heavy, and the trading has no significance beyond the fact that it shows that new requirements have to be met by new purchases. So far deliveries from furnaces have not increased very much, and until they do there will be no satisfactory evidence of improvement in conditions. As regards the distribution of orders among consumers of Pig Iron, nothing particularly encouraging has developed recently. The Pennsylvania order for the delivery of castings is so remote that it has attracted little attention. Immediate business is what is wanted, something for delivery two or three years hence being a matter of comparative indifference. The most complete confidence is felt in regard to ultimate conditions in the Iron trade, but there is undoubtedly uncertainty if not anxiety in regard to conditions during the remainder of 1904. This is shown by the disposition to reduce production. If there was felt to be any certainty of improvement in the near future, there would be less willingness to curtail the output, but there is not only a decrease in output, but a decrease in prices, conditions which need no argument to show that the outlook is not very cheerful. At the same time producers are adjusting themselves to the changed conditions, and are therefore giving the strongest assurance that the market will not get beyond their control. It is not unlikely that $14 may be reached for No. 2 X Foundry Iron, although for the present $14.25 to $14.50 are regarded as bottom for good brands of that grade. Of course, the unexpected may happen and prices may go below that figure, or they may take a turn in the other direction, but at the moment the latter is considered as rather a remote possibility and the former somewhat of a probability. To-day's prices, however, for Philadelphia and nearby deliveries are about as follows:

No. 1 X Foundry	$15.00 to $15.25
No. 2 X Foundry	14.25 to 14.50
No. 2 Plain	13.50 to 13.75
Standard Gray Forge	13.00 to 13.25
Ordinary Gray Forge	12.50 to 12.75
Southern No. 2 X Forge, rail	13.50 to 13.75
Basic	13.00 to 13.15
Low Phosphorus	17.50 to 18.00

Steel.—In a small way there is a good demand, and $24 is readily paid for prompt deliveries. There is no demand for long deliveries, but as consumers carry no stock, they are pretty steady buyers week in and week out.

Plates.—A little better demand has been reported during the past week, and mills have probably gained a little, although they are still dependent on the day to day demand. There is no particular change in the outlook, and probably will not be any until the season is a little further advanced. Prices unchanged, as follows:

	Carloads. Cents.	Part carloads. Cents.
Tank Steel, ¼-inch and heavier	1.73½	1.78½
Tank Steel, 3-16-inch	1.83½	1.88½
Tank Steel, Nos. 7 and 8, B. W. G.	1.88½	1.93½
Tank Steel, Nos. 9 and 10, B. W. G.	1.98½	2.03½
Flange or Boiler Steel	1.83½	1.88½
Commercial Fire Box Steel	1.93½	1.98½
Still Bottom Steel	2.03½	2.08½
Locomotive Fire Box Steel	2.23½	2.28½
Plates over 100 to 110 inches	.05 per lb. extra	
Plates over 110 to 115 inches	.10 "	
Plates over 115 to 120 inches	.15 "	
Plates over 120 to 125 inches	.25 "	
Plates over 125 to 130 inches	.50 "	
Plates over 130 inches	1.00 "	
All sketches (excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10 "	
Complete Circles	.20 "	

Structural Material.—No change in this department. Mills continue running irregularly on new business. Those who have old orders are enabled to run moderately full by using back log orders, new business being somewhat light. Prices unchanged, as follows: Beams, Channels and Angles, 1.73½c. to 1.85c., according to specifications, and small Angles, 1.50c. to 1.55c.

Bars.—As a rule business is dull, although one or two good sized orders have been placed by the railways. The demand is very irregular, however, and on an average not sufficient to give more than half to two-thirds employment. Prices were reaffirmed at the meeting held on last Thursday, but some of the members favored a reduction on the ground that prices had not been maintained as they ought to be, which was disadvantageous to those who lived up to the agreement. The 1.35c., base, was reaffirmed, however, equivalent to 1.48½c., Philadelphia and nearby points, for best refined Iron in carload lots, and 1.48½c. for Steel Bars.

Sheets.—There are no features calling for special remark. Business is not active, but it holds its own, and that is about all that ought to be expected these times.

Old Material.—There is a better feeling, and holders are asking a little more money. Steel is dearer, with $12 about an average quotation for food stock. Low Phosphorus Scrap is also doing better, with $16 bid and $16.50 asked. Bids and offers for deliveries in buyers' yards are about as follows:

No. 1 Steel Scrap, delivered	$11.50 to $12.00
Old Steel Axles, delivered	14.50 to 15.00
Old Iron Axles, delivered	17.50 to 18.00
Old Iron Rails, delivered	13.75 to 14.50
Old Car Wheels, delivered	10.50 to 11.00
Choice Scrap, R. R. No. 1 Wrought, delivered	13.00 to 13.50
Machinery Scrap, delivered	11.50 to 12.50
Low Phosphorus Scrap, delivered	16.00 to 16.50
Wrought Iron Pipe, delivered	9.50 to 10.00
No. 2 Forge Fire Scrap, delivered	9.00 to 9.50
No. 2 Forge Fire Scrap, Ordinary, delivered	7.50 to 7.75
Wrought Turnings, delivered	8.00 to 8.50
Cast Borings, delivered	6.00 to 6.25
Stove Plates, delivered	8.75 to 9.25

Cincinnati.

FIFTH AND MAIN STS., July 27, 1904.—(*By Telegraph.*)

Pig Iron.—Some activity has prevailed during the week and buying of Foundry Iron has been much more free. This refers to the territory west of Ohio more than to other sections so far as Southern Iron is concerned, as it is conceded there are no points in Ohio, except Cincinnati, to which Southern Iron can be shipped at prices that will meet Northern competition. We learn that one sale of 4000 tons of Southern Iron was made for delivery at Newcomerstown, Ohio, the price made being a special one. The tonnage being placed as a rule is small and represents early requirements only. In the buying during the week Northern producers met Southern prices as far West as Indianapolis, and it now seems almost an established fact that Southern Iron cannot be placed in competition with Northern at points north of Cincinnati or east of Indianapolis. Prices of Northern Iron are reported as no lower; in fact, they appear to have improved slightly. The demand for foundry products shows a little more activity, and while this evidence of returning prosperity is very slight, it seems to be more general, and a gradual development is looked for. We learn that in Chicago territory the buying has been more general and in larger volume and that there is evidence of a still further movement. We note only one inquiry during the week of any considerable tonnage, and that calls for 2200 tons of both Northern and Southern for an implement concern located in Northern Ohio, deliveries to be made beginning September 1. Prices are firmer and are a shade higher. We have been unable to find any $9 Iron in the market; in fact, $9.25 for No. 2, Birmingham basis, is undoubtedly the minimum figure. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$12.50 to $12.75
Southern Coke, No. 2	12.00 to 12.25
Southern Coke, No. 3	11.50 to 11.75
Southern Coke, No. 4	11.25 to 11.50
Southern Coke, No. 1 Soft	12.50 to 12.75
Southern Coke, No. 2 Soft	12.00 to 12.25
Southern Coke, Gray Forge	11.00 to 11.25
Southern Coke, Mottled	10.75 to 11.00
Ohio Silvery, No. 1	15.65 to 16.15
Lake Superior Coke, No. 1	13.15 to 13.65
Lake Superior Coke, No. 2	12.65 to 13.15
Lake Superior Coke, No. 3	12.15 to 12.65

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	$16.25 to $16.75
Lake Superior Car Wheel and Malleable	15.80 to 16.30

Coke.—The Coke market continues in bad shape, and the little that comes up from time to time is able to bring out prices lower than market quotations. It is expected that it will be several months before any improvement can be noted in this commodity. Quotations on best grades, 72-hour, remain at $1.75 to $2, f.o.b. ovens.

Plates and Bars.—The demand for Finished Material, while somewhat more active than a month ago, is far from normal. Inquiries are better and more general, but buyers are holding aloof for some reason. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.40c., with half extras; the same in smaller lots, 1.70c., with full extras; Steel Bars, in carload lots, 1.48c., with half extras; the same in smaller lots, 1.80c., with full extras; Base Angles, 1.73c. in carload lots; Beams and Channels in carload lots, 1.73c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 2c.; Sheets, 16-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, ⅝ x 3-16 and heavier, 1.68c. in carload lots.

Old Material.—The week has been exceedingly quiet and is but a repetition of those immediately preceding. It is impossible to learn of any change in prices, and we believe they remain the same. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, $11 to $11.50 per net ton; No. 1 Cast Scrap, $9.25 per net ton; Iron Rails, $14.50 per gross ton; Steel Rails, rolling mill lengths, $11 to $11.50 per gross ton; Iron Axles, $15 per net ton; Car Wheels, $11 to $11.50 per gross ton; Heavy Melting Scrap, $11.50 per gross ton; Low Phosphorus Scrap, $11.50 to $12 per gross ton.

Cleveland.

CLEVELAND, OHIO, July 26, 1904.

Iron Ore.—Shipments down the lakes have improved in some respects. The lower lake docks are handling the material rapidly, the supply of cars is good and the boats are getting good dispatch. The indications are that July will exceed July last year. This will bring the season's shipment upon the basis of 17,000,000 tons for the year, this estimate being based upon the normal movement during the fall months. At the present time the furnaces are not melting up to that figure. But the promised and prospective increase in the melt will change the situation. While the lake movement has increased, there is no change in the rate situation, the market being firm at the old figures. The shippers are not looking for tonnage, but rather the vessel owners are seeking loads at the opening rates of 70c. from Duluth, 65c. from Marquette and 55c. from Escanaba. The buying of Ore continues to be very light, with the minimum amount of interest in that trade. Increased shipments from the lakes to the furnaces are taken to indicate that furnace stocks are running low.

Pig Iron.—The market has not improved as far as actual buying goes. In a sentimental way, there is a change for the better. The market is more steady, and, if anything, there is an upward trend to things. Many of the furnaces, which it was intended to suspend, will be continued in operation, and their output will be piled against the return of a more active demand for Iron. There is some talk of resumption by some other furnaces, but just what there is immediately ahead for them does not appear now. There is a little buying of Foundry at prices ranging between $11.75 and $12. The talk of Iron at $11.65 or less was not on Standard Iron, but rather on poor material, which went at a good price, when sold slightly below the market for Standard No. 2. Inquiry for future deliveries is light as yet, but there is more of a tendency in that direction. There was some talk of a big sale of Basic, but it could not be found that any such lot as the reported 4000 tons changed hands. The Bessemer trade is dull. Malleable is in fair demand, at prices even with those on No. 2 Foundry. Coke buying is easier, and prices hold steady. We quote Pig Iron prices, f.o.b. Cleveland, as follows:

Northern Coke, No. 1 Foundry	$13.50 to $13.75
Northern Coke, No. 2 Foundry	13.00 to 13.25
Northern Coke, No. 3 Foundry	12.50 to 12.75
Southern Coke, No. 1 Foundry	13.35 to 13.60
Southern Coke, No. 2 Foundry	12.85 to 13.10
Southern Coke, No. 1 Soft	13.35 to 13.60
Southern Coke, No. 2 Soft	12.85 to 13.10
Jackson County, 8 per cent. Silicon	.... to 16.45
Hanging Rock Charcoal, No. 1	.... to 23.45
Southern Charcoal, No. 1	.... to 17.85
Lake Superior Charcoal	15.50 to 16.00

Finished Iron and Steel.—Conditions are more cheerful, but hardly improved. Such betterment as is seen is almost entirely of a sentimental nature. The tone of the market is best told in the fact that whereas recently cutting of prices by small mills was contemplated with something of dismay, the same condition is now viewed from an entirely different aspect. It is now considered impossible for the small mills with limited facilities to encroach seriously upon the business of the larger mills. Therefore, the competition is the more ignored, and the return to nominal quotations is the more complete. The best buying now is in Structural, where the prices are considered good. The amounts sold range from 200 to 1000 tons. While this is not up to last year, it is, nevertheless, an improvement over recent sales. The difference is that spot buying is now substituted for specifying on contracts, the latter having expired. Spot buying in this territory will improve, therefore, but the volume of business done will not of necessity increase. Plates show small improvement. The cutting in prices which has been done has come mostly from small mills having a limited capacity. Many of them produce only Universal Plates and are not a strong competitive factor. The mills have, therefore, adhered pretty closely to the association lists. In Sheets there is now a little buying, but it is confessedly light. The smaller mills have come to the point where they can make no more cuts in prices, and, therefore, the market is about holding its own. Some mills make the specific statement that on the lighter gauges they are losing money, hence they will sell at no lower prices. Stock prices are not disturbed. The quotations range at 2.50c. for No. 27, out of stock, and 2.05c. to 2.10c. for No. 27 Black, in car lots at the mill. The Bar situation is firmer. Some mills have refused to take choice specifications on Bar Iron at 1.30c. at the mill. That, however, seems to be the price on big tonnage. Small lots would command a higher price. Bar Steel holds steady, Bessemer being firm at 1.35c. at the mill. Billets and Rails show no change, and the market appears to be righting itself sentimentally, preparing for a material change later on.

Old Material.—The market is easy, and prices are hardening very little. Buying has not even resumed to any extent that seems promising. Prices are quoted, as follows: All gross tons: Old Steel Rails, $12; Old Car Wheels, $11 to $12; Heavy Melting Steel, $11. All net tons: Cast Boring, $4; No. 1 Busheling, $10 to $10.50; No. 1 Railroad Wrought, $11.50 to $12.50; Wrought Turnings, $6.50 to $7; Iron Car Axles (nominal), $16 to $17; No. 1 Cast, $10 to $10.50; Stove Plate, $7 to $7.50.

Pittsburgh.

PARK BUILDING, July 27, 1904.—(*By Telegraph.*)

Pig Iron.—General conditions in the Pig Iron trade contine to improve, there being some large inquiries in the market for Bessemer and Foundry Iron for shipment over the balance of this year. The Valley furnaces, as a rule, are holding Bessemer Iron for delivery over the balance of this year at $12.85, Pittsburgh; for August and September shipment, Bessemer Iron could probably be bought in small lots at $11.75 to $11.85, at furnace. The Valley furnaces are holding Basic Iron for shipment over the rest of this year at $11.50, at furnace, but for prompt shipment this price might be shaded 10c. or 15c. a ton. Northern No. 2 Foundry Iron is held firmly at $12, at furnace, for the balance of the year delivery, while for prompt delivery $11.65 to $11.75 could be done. There is a good deal of inquiry for Foundry Iron and some good sized sales have been made at above prices. Inquiries for Bessemer Iron are also large, and we note sales of fully 10,000 tons at prices ranging from $11.65, at furnace, for prompt Iron up to $12 for balance of the year delivery. We also note sales of about 4000 tons of Malleable Bessemer Iron at $11.50, Valley furnace. There is a better inquiry for Forge Iron, which is held firmly at $11, Valley, for prompt shipment, and $11.15 to $11.25, Valley, for deliveries running up to December, the freight to Pittsburgh being 85c. a ton.

Steel.—More encouraging reports are received in regard to the Steel trade, the demand for Billets and Sheet Bars being heavier than for some time. Official prices on Billets and Sheet and Tin Bars are, we are advised, being more firmly held than for some time, any cutting in prices being done by small outside Steel plants that have a limited capacity in Billets and Bars. The official price of Bessemer and Open Hearth Billets is $23; long Sheet and Tin Bars, $24, and Cut Bars, $24.50, Pittsburgh, Wheeling or Youngstown delivery.

(*By Mail.*)

The past week in the Iron trade has given conclusive evidence that general conditions are better, and many in the trade are optimistic as to the future. The heavy curtailment in output of Pig Iron and the decline of prices to a point that left little or no profit to the furnaceman were well known to consumers and started a buying movement about two weeks ago that has put up prices on Pig Iron fully 50c. a ton, and the market to-day is firmer, while actual sales and inquiries are heavier than at any time in the past three or four months. Only a short time ago consumers of Pig Iron would buy only from hand to mouth and had no confidence in the future. The situation to-day is reversed, and users of Pig Iron are in the market with heavy inquiries and for shipment over the balance of this year. The Bessemer Furnace Association reports that in the past week it has refused $11.85, Valley, for Bessemer Iron for delivery over the balance of the year, and the furnaces belonging to the association are holding Bessemer Iron at 12 at furnace, for delivery up to close of the year, and Basic at $11.50 at furnace. For August and September delivery Bessemer could probably be bought at $11.75 to $11.80, Valley, and Basic at $11.35 to $11.40, Valley. Inquiries for Foundry Iron are heavier, and a good deal of tonnage is changing hands. Northern No. 2 Foundry for spot shipment could be bought in small lots at $11.65 to $11.75, Valley, or $12.50 to $12.60, Pittsburgh. For delivery running over rest of this year most of the furnaces are quoting $12 at furnace and refuse to shade that price. There is a little more doing in Forge Iron, and Northern brands are held at $11, Valley, for prompt shipment, and $11.15, Valley, for forward delivery, or $12, Pittsburgh.

Owing to the improvement in the Pig Iron trade it is probable that the percentage of blast furnaces that will be shown as out of blast on August 1 will be smaller than anticipated. On July 1 the report of the Bessemer Furnace Association showed that on that date 35 per cent. of the furnaces were idle. The report of August 1 is not expected to show above 38 to 40 per cent. idle. A number of stacks that contemplated going out will remain in blast on account of the better demand for Pig Iron.

To-day (Tuesday) a conference is being held at Youngstown, between committees of the Amalgamated Association and the Carnegie Steel Company, and it is expected that the wage scales for the Hoop mills will be arranged this week. A conference will be held within two weeks by the Board of Conciliation appointed by the Amalgamated Association and Republic Iron & Steel Company, to arrange the puddling and finishing scales. The Sheet and Tin Plate scales have all been settled, and it is probable all the wage scales will be fixed up not later than August 10 next. It can be said that prospects in the Iron trade from every standpoint are better to-day than at any time in the last three or four months.

Ferromanganese.—There are no inquiries, and we quote English and domestic Ferro at $41.50 to $42, Pittsburgh.

Muck Bar.—As a result of the starting up of a number of Bar Iron mills that were closed for inventory and repairs, inquiries for Muck Bar are a little better and prices are slightly firmer. We quote best grades of Muck Bar, made from all Pig Iron, at $24, Pittsburgh.

Wire Rods.—We understand that a considerable tonnage of Wire Rods for Western delivery was placed last week, the business going to a Chicago mill. Inquiries for Rods are better, and prices are reported as a little firmer. We quote Bessemer and Open Hearth Rods at $28, Pittsburgh.

Skelp.—Sales of 2000 to 2500 tons of Grooved Iron Skelp are reported on the basis of about 1.37½c., Pittsburgh. We quote Grooved Iron Skelp at 1.37½c. to 1.40c., and Sheared at 1.45c. to 1.47½c. Grooved and Sheared Steel Skelp is held at about 1.32½c., Pittsburgh.

Steel Rails.—The Wabash Railroad is reported to have placed a fairly large tonnage of Rails, the business going to a local mill. No other contracts have been placed since our last report, but the tonnage of Rails for this year will be a little larger than expected. We quote at $28 at mill for Standard Sections, the mills equalizing freights. Low prices continue to be made on Light Rails, which are selling at $20 and upward, depending on weights.

Structural Material.—Quite an improvement is noted in the Structural trade, and more work is in sight than for some time. A good deal of work has been given out in the East, and several large local jobs will be placed before long. The Carnegie Steel Company will soon commence deliveries of the Steel for the Diamond National Bank Building now being erected in this city. Reports are that some low prices are being made for erecting work. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Plates.—Tonnage in Plates is heavier than for some time, and several of the local mills that have done very little for the past three or four months are now running full time, with a good deal of work ahead. The car interests are placing more tonnage, while the boiler and erecting shops are also buying more freely. The recent action of the Plate Association in affirming prices has had a good effect on the Plate trade. We quote: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh: Flange and Boiler Steel, 1.70c.; Marine, A. B., M. A. and ordinary Fire Box, 1.80c.; Still Bottom, 1.90c.; Locomotive Fire Box, not less than 2.10c., and up to 3c.; Plates over 100 inches to 110 inches in width, not less than 5c. per 100 lbs. extra; Plates over 110 inches to 115 inches wide, not less

than 10c. extra; Plates over 120 inches to 125 inches wide, not less than 25c. extra; Plates over 125 inches to 130 inches wide, not less than 50c. extra; Plates over 130 inches wide, not less than $1 extra; Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. Above prices are on carload lots, f.o.b. at mill, Pittsburgh, with 5c. extra for less than carload lots; terms, net cash in 30 days, and for all points of delivery in the United States except the Pacific Coast.

Sheets.—The Sheet trade is sharing in the general betterment in the Iron trade, and inquiries are larger than for some time, while actual tonnage being placed is also heavier. Several of the leading Sheet mills report actual tonnage being heavier this month than at any time since last April, while specifications are also coming in more satisfactorily. We quote as follows: No. 26 Black Sheets, box annealed, one pass through cold rolls, 1.95c.; No. 27, 2c.; No. 28, 2.10c. For very desirable specifications some mills might shade these prices about $1 a ton. Galvanized Sheets are selling at about 80 and 7½ per cent. off. In net prices this discount figures out as follows: Nos. 22 and 24 Galvanized Sheets, 2.59c.; Nos. 25 and 26, 2.77c.; No. 27, 2.96c., and No. 28, 3.14c. All above prices are for carload and larger lots, jobbers charging the usual advances for small lots from store.

Iron and Steel Bars.—A moderate amount of tonnage is being placed, and the Bar mills are entering more business than for some time. The car and implement makers are placing orders more freely, and outlook for the future is quite encouraging. We quote Refined Iron Bars at 1.30c., Pittsburgh, but on Bars made partly from Scrap, this price might be shaded about $1 a ton. We quote Steel Bars at 1.35c., Pittsburgh, in carloads and larger lots, with the usual differential for less than carloads. On Open Hearth Bars $1 a ton advance is charged.

Spikes.—A fair amount of new business is being placed and we quote Spikes at $1.60 per 100 lbs., f.o.b. Pittsburgh, for less than carloads, while for carloads and larger lots $1.55 per 100 lbs. is being quoted.

Hoops and Bands.—Very little new tonnage is being placed in either Hoops or Bands, consumers having covered ahead before the advance in prices was made. We quote Steel Hoops at 1.55c. and Bands at 1.35c., extras as per Steel card. It is claimed these prices are being rigidly held.

Merchant Pipe.—General conditions in the Pipe trade are reported as showing improvement, orders being placed more freely than for some time. The leading mills are running quite full and have a fair amount of tonnage ahead. Several large contracts for Line Pipe are pending, which may be placed at any time. It is stated that prices are being better maintained than for some time, discounts to consumers in carloads being as follows:

Merchant Pipe.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛, ¼ and ⅜ inch	70	55	69	54
½ inch	73	63	72	62
¾ to 3 inches	78½	68½	77½	67½
3½ to 6 inches	77	67	76	66
7 to 12 inches	72½	57	71½	56
Extra strong, plain ends, ⅛ to 8 inches	69	59	68	58
Double extra strong, plain ends, ⅛ to 8 inches	60	50	56	46

Boiler Tubes.—Demand for Boiler Tubes is dull and there is some little unevenness in prices. Discounts to consumers in small lots are as follows:

Boiler Tubes.

	Steel.	Iron.
1 to 1½ inches	48	43
1¾ to 2¼ inches	60	43
2½ inches	62	48
2¾ to 5 inches	68	55
6 to 13 inches	60	43

In carload lots discounts are two points lower than the above.

Merchant Steel.—No change in prices of Shafting was made at the meeting of the mills held last week. Some reports of cutting in prices were made, and a determined effort will be made in the future to maintain official discounts. There is a fair demand for Merchant Steels, but on Spring Steel lower prices are being made. We quote: Plow Slabs, ¾ inch and heavier, 1.60c.; Tire Steel, 1.55c. to 1.60c.; Sleigh Shoe, flat, 1.40c. to 1.45c.; Cutter Shoes, 2.05c. to 2.10c.; Plow Steel, 6 inches and under, 1.35c.; Toe Calk Steel, 1.85c. to 1.90c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades and 12c. and upward for special grades. Shafting is 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered.

Spelter.—The market is quiet and prices are easy. We quote prime Western grades at 4.72½c., Pittsburgh, but on a firm offer and for spot shipment this price might be slightly shaded.

Tin Plate.—It is between seasons in Tin Plate and very little new business is being placed. The mills are filled up on contracts and are running full. We quote 100-lb. Cokes at $3.40, Pittsburgh.

Coke.—The Coke trade continues to show betterment, the output last week showing 13,000 tons increase over the week previous, while shipments were 25,000 tons larger. Strictly Connellsville Furnace Coke is held at $1.45 to $1.50 and 72-hour Foundry at $1.75 to $1.85, at oven. Main Line Furnace Coke, which is not quite as high in quality as Connellsville, is selling at $1.25 to $1.35, and Foundry 1.65 to $1.75 a ton at oven.

Iron and Steel Scrap.—The improvement in Pig Iron has extended to the Scrap trade, demand being better than for some time, while prices on most kinds of Scrap are about 50c. a ton higher. We quote: Heavy Melting Scrap, $11 to $11.50; Cast Iron Borings, $5 to $6; Steel Turnings, $7.50 to $8; Busheling Scrap, $8.50 to $9; Bundled Sheet Scrap, $8; Cupola Scrap, $10.50 to $11, all in gross tons. There is very little doing in No. 1 Wrought Scrap, which is held nominally at $10.50 in net tons.

Birmingham.

(*By Telegraph.*)

BIRMINGHAM, ALA., July 26, 1904.—The United Mine Workers of the Alabama district, after a short session yesterday, declared in favor of a strike, and by this action have partially tied up the Iron industries of the district. The movement affects over 8000 workmen, who have been out of employment since July 1 waiting for the adjustment of the scale of wages. The miners contend for a scale that equals the scale of last year, which calls for a minimum of 47½c. per ton when Iron is selling at $8 per ton, and a maximum of 57½c. when Iron is selling at $11.50, and the operators offer a scale of 7½c. per ton less. The miners claim that this means a reduction of 10c. per ton on the minimum price heretofore prevailing.

This is the first general strike ordered since 1894. The miners say: "After several conferences with the operators' committee we have failed to reach a settlement, the operators insisting that we accept their proposed scale, which means a reduction of 10c. on the minimum and 7½c. per ton on the maximum price of mining Coal, and a return to the monthly pay day system and some alterations in the wages of day labor." So no agreement was reached and affairs are in an unsettled condition. If a joint commission is now called the operators would have to take the initiative, and their policy seems to be one of masterly inactivity.

Beyond the statement of unsatisfactory conditions all is speculation. Time only will develop affairs. The price of Iron is tending to greater firmness.

The Belgian Iron Market.

BRUSSELS, June 30, 1904.

An unfortunate impression has been created by the delay in the negotiations between the German, French and Belgian Steel works to reach an international understanding. This feeling is emphasized by the fact that the Belgian Steel syndicate has not yet succeeded in reaching a legal status. This latter point is of great importance, since the buyers, in the absence of a syndicate, are in a position to continue their speculative operations and work for lower prices. So far as the international combination is concerned, it is impossible to foresee whether success will crown the efforts made. It is widely believed here that there are few chances for reaching such an understanding. On the other hand, the argument is advanced that it always takes a long time to close up negotiations of this character. Belgium, so far as it is specially concerned, has shown clearly an hostility to the combination such as it has been proposed. As a matter of fact, Germany and France make it a condition to the international understanding that they be confirmed in the position acquired by them. That is to say, there must be accorded to them the right to furnish to Belgium a certain quantity of Steel Billets based on the tonnage delivered during the last year and during the first months of the current year. Thus, for example, Belgium consumed in 1903, 1,125,000 tons of crude Steel, of which 981,500 tons were produced in the country and 143,500 tons were imported from Germany and France, 100,000 tons coming from the former and 43,000 tons from the latter. Admitting that it might be possible to agree upon 1,125,000 tons as the quantity to be distributed for 1904, then the two countries named would demand from the outstart their 100,000 tons and 43,000 tons respectively. This point of view has met with lively opposition on the part of our Steel works. They object that it has been due solely to the very low prices which the Germans and French have made that they have been able to increase considerably their import of crude Steel into our country. Now since the aim of the pool is to raise these prices, a point would be reached where the Belgian rolling mills would at least partly give up the rolling of Steel, since it had become dear, to turn back to the rolling of Iron. The result would be that as the demand for crude Steel went on diminishing, the point would be reached that the Germans and French alone would supply our pure rolling mills. It is certain that under such conditions an understanding cannot be reached.

The Belgian Pig Iron syndicate continues to negotiate with the Lorain and Luxemburg syndicate, with the object of reaching an understanding on prices and on participation in quantities. In principle, the arrangement has been concluded, but it must still be ratified by the administrative councils of the two organizations. This ratification will not be an easy matter, contrary to general expectation, because of the opposition of the Sambre et Moselle Company. For special reasons the interests of this company are not very close in this affair to those of the other members of the syndicate. It is generally believed that this opposition will be easily met, but even though that be true it will finally be necessary to reach a similar understanding with the Longwy syndicate of France, and it is in this direction that the greatest difficulties will be met. First of all, this syndicate will have to be reorganized, because now it only controls sales in the home market. Possibly after a good deal of time and a good deal of perseverance the end may be reached.

So far as the situation of the market in particular is concerned, it may be noted that in Pig Iron there has been a cessation of transactions, requirements having been covered until the end of September, and in some cases as far as the end of the year. Prices have remained with little change at 59 francs for No. 3 Luxemburg Foundry Iron, 52 francs for Athus Mill Iron, 55 to 56 francs for Charlerol Iron and 62 francs for Basic Pig. Muck Bar is firm. As a result of the great heat, a number of mills have slowed down and some of them have even stopped altogether. The result is that there is a scarcity in Muck Bars. Prices for ordinary quality are 92.50 to 95 francs. Old Material is in good demand and is fetching higher prices. Steel is firm, Ingots fetching 88 francs, Blooms 94 francs and Billets 97.50 francs.

During the month of June the market on finished products has been rather depressed. Orders have been rare and are only captured after a fierce struggle over prices. Thus tonnage in Bars has been sold to firms in London and in Hamburg at £4 16s., which represents a lowering in price of 2 and 3 shillings, during the last five weeks. This lowering is largely attributed to speculation, the middlemen withholding their orders in order to depress prices. This manipulation is possible, since the market is entirely free. Besides this, the requirements are not large in the great consuming centers, and then the dumping on the part of the Germans is always playing a certain part. The Beam trade is in a fair condition, so far as the home market is concerned, where fairly important orders are coming up. To the home consumer the base price is 122.50 francs, f.o.b. cars at mill. For export, prices are with difficulty maintained at £4 6s., f.o.b. Antwerp; £4 5s. and even £4 4s. is being done.

So far as Rails are concerned, there has been a good deal of talk in the press about the convention between Germany, England and Belgium, which is claimed to have agreed to give 56 per cent. of the tonnage to England, on account of the preference which is given to Great Britain by her colonies. This statement is not exact. At the most an amicable understanding exists between the interested mills on the point of a uniform price, yet the assurance can be made that even that price is not rigorously observed.

At a recent meeting the manufacturers of Plates agreed not to go below a certain figure in selling prices, having finally realized how useless it is to make new sacrifices. No. 2 Iron Plates, ⅛ inch and upward, are selling for the home market at 140 francs and for export at £5 10s., the same prices being made for Basic Steel. For Open Hearth Steel the prices are respectively 150 to 155 francs and £6 1s. The Wire mills continue to complain of the weakness of the market. No. 2 Iron Rods are selling at 140 francs for the home market and 137.50 francs for export. The Wire Nail mills are not doing a particularly brilliant business. The syndicate, in order to make existence possible to the Esperance Company, has decided to lower prices 4 francs per 100 kilos. The construction shops are generally well provided with work, and are not making any complaints. On the other hand, the Bolt works, although they are well supplied with work, are selling at ridiculous prices.

The New York Machinery Market.

NEW YORK, July 27, 1904.

Optimism continues. The better feeling which has characterized the machinery trade during the last three or four weeks still prevails. During the last week it has, in fact, increased, for the conspicuous happenings of the week have all been of a nature confirming the dominant spirit of hopefulness. The movement in the direction of the consummation of big things has kept up, and in all quarters of the trade an improvement in general business is reported.

The most important contract placed during the week in connection with the Pennsylvania Railroad tunnel project was for air compressors for the Hudson River section of the work. It was placed by the O'Rourke Engineering Construction Company with the Ingersoll-Sergeant Drill Company of 26 Cortlandt street, New York. The contract calls for eight machines aggregating in capacity about 32,000 cubic feet per minute. They are to be divided into two plants, one of which will be located at the New York end of the Hudson River tunnel and the other at the mouth of the tubes at Weehawken, N. J. There will be two high pressure cross compound Corliss duplex machines having a capacity of 4000 cubic feet each, and six 36-inch stroke duplex Corliss units, having a capacity of 3890 cubic feet per minute each. The order also includes condensers, coolers and all of the accessories to the compressors, but does not include the boilers or any of the steam generating appurtenances. It was expected in the trade that the O'Rourke Company would award a blanket contract covering the entire plant, including the steam end. The contracts for the boilers and steam specialties have not been awarded as yet.

The plant is to be built according to the specifications issued by the Pennsylvania Railroad, and as the severity of these has been the cause for a good deal of comment in the trade, considerable interest attaches to the installation, which will be expected to prove as economical as any air compressing plant ever installed. With the installation of this plant the total number of Ingersoll-Sergeant compressors used in connection with the subaqueous tunnels in New York will be 23.

The only contract of importance awarded by S. Pearson & Sons, Limited, who have the contract for the East River section of the tunnel was that for the bolts, which we referred to last week. The entire quantity required amounts to 3920 tons, and it was divided into two equal contracts, which were awarded to the Oliver Iron & Steel Company, Pittsburgh, and the Cambria Steel Company, Cambria, Pa.

In the machine tool trade the movements of the railroads still furnish topics of absorbing interest. The specifications being issued by the Pennsylvania Railroad, to which we have previously referred, are by far the most important now commanding the attention of the trade. During the last week a large number of inquiries were added to the batch previously received by the prominent machinery merchants. The list, as it now stands, is larger than anything of the sort ever issued before, and the reports current in the trade say that there are still a great many more items to be received before the list is complete. Machinery representatives who are following up the matter say that the specifications when completed will represent an aggregate of $1,000,000 worth of machine tools. These same parties say that it is not likely that the orders will be placed immediately, some saying that the purchases are to be extended over the present fiscal year. Accurate information on this point cannot be had at present, as all of the correspondence sent out by the railroad company is silent concerning any time when the machinery may be required. The inquiries simply request the bidders to name the earliest date at which they can deliver the tools specified. No point of destination is named, and this point is taken as confirmation of the prevalent belief that the tools are to be distributed among the various shops along the system, as well as for contemplated new shops, such as the proposed shops at Trenton, N. J. Even as an inquiry this is the largest machine tool proposition ever submitted to the machine tool trade in this country.

Two important machine tool transactions were closed by Western railroads. Both contracts were awarded to the Niles-Bement-Pond Company. The larger of the two, which included between $90,000 and $100,000 worth of machine tools, was awarded by the St. Louis & San Francisco Railroad, whose executive offices are located at 71 Broadway, New York, and whose general offices are located in St. Louis. The order covered the general run of railroad shop tools which are to be placed in various shops along the system. The other contract amounted to about $75,000 and was awarded by the Pere Marquette Railroad Company of Detroit, Mich. This equipment is for the new shops at Grand Rapids, Mich., which will consist mainly of a machine shop, blacksmith shop and power house. The cost of these buildings alone is estimated at $200,000. This company also intend establishing shops at St. Thomas, Canada.

An important list of machinery to be purchased has just been issued by the Fabrica de Carros y Fundicion Mexicana, S. A., or the Mexican Car & Foundry Company, S. A., City of Mexico. The offices of the company are located at 404 Avenida Juarez, Mexico, D. F. The officers of the company are as follows: Isaac M. Hutchison, president and general manager; Lic. Pablo Martinez Del Rio, vice-president; William H. Horn, treasurer, and Ned Ayer, secretary. This company intends constructing an extensive shop system at Hutchison, D. F., Mexico, for the building and repair of railway cars. The plant will consist of the following buildings: Truck shop, 60 x 140 feet; machine shop and blacksmith shop, 80 x 320 feet; erecting shop, 80 x 60 feet; wheel and soft iron foundry, 160 x 200 feet; woodworking shop, 100 x 200 feet; power house, 50 x 65 feet; pattern shop, 50 x 100 feet; pipe and tin shop, 30 x 100 feet; paint shop, 30 x 100 feet; dry kilns, 70 x 80 feet; storage house, 50 x 80 feet; coaling shop, 25 x 70 feet; oil and waste house, 25 x 50 feet; core sand shed, 30 x 80 feet; coke shed, 30 x 80 feet, and

molding sand shed, 30 x 125 feet. There will also be a transfer table, 40 x 510 feet. The machinery list includes almost 100 machines of various types, and is as follows:

Blacksmith Shop.—Two bolt headers, one bull dozer, three double punch and shears, one single bar iron shear, one upsetting machine, one steam hammer, two Bradley helve hammers, one corner plate bender, one fan for blast, two single head bolt cutters.

Truck Shop.—One axle centering machine, six double head axle lathes, two wheel boring machines, one wheel press, one pneumatic riveter, one grindstone, one emery wheel, one trolley for axles with air hoist, one traveling crane with air hoist.

Machine Shop.—Two planers, 28 inch x 28 inch x 9 foot table; two lathes, 9-inch swing, 8 feet between centers; one lathe, 15-inch swing, 18 feet between centers; one shaper, 20 inch x 5 feet; five drill presses, one eight-spindle arch bar drill, one bolt cutter, double head, two four-spindle vertical nut tappers, one emery wheel stand, one grindstone, three bolt cutters, double head.

Wood Working Shop.—One sill dresser, one double automatic cut-off saw, one end tenoner for sills, two vertical boring machines, four stationary spindle boring machines, three radial boring machines, two four-spindle boring machines, one vertical hollow chisel mortiser, one gainer for sills, one planer for heavy timbers, one heavy automatic cut-off saw, one planer for light timbers, one medium automatic cut-off saw, one universal wood worker, one post tenoner, one band saw, one gainer for timbers, one horizontal hollow chisel mortising machine, two matchers, one sticker, two swinging cut-off saws, one sliding table cut-off saw, one shaper, two single-spindle boring machines, one rip saw, for resawing timbers; one rip saw, for sizing flooring, &c.; three rip saws—two for grooving posts and one for general use; one automatic knife grinding machine, for planing knives; one automatic band saw filing machine, one automatic circular saw grinding machine, one exhaust fan for shavings.

The company intends purchasing the machinery as quickly as possible, as it expects to be turning out freight cars in December of this year.

In addition to building the shops, the company's project calls for the founding of a town adjacent to the plant. This will be laid out in most approved style, having its principal streets radiating from a large semicircular public park situated immediately in front of the railway station. As planned at present the town will consist of 18 large squares. Isaac M. Hutchison is giving the entire project his personal attention.

To study conditions prevailing abroad, particularly so far as the use of pneumatic tools is concerned, William P. Pressinger, manager of the air compressor department of the Chicago Pneumatic Tool Company, has just made a rather extended tour through the principal countries of Europe. In summarizing his deductions Mr. Pressinger said that in almost every country business is gradually improving, and with the betterment of general conditions, the disposition to adopt pneumatic tools and other labor saving machinery promises a strong growth. The great difficulty which has retarded a more universal use of pneumatic machinery in Europe he found is that its use is so far in advance of the ordinary methods that the European mechanic has been unable to realize its advantages without actually seeing it in operation, and the European machinery merchant has failed to meet the situation by properly demonstrating the use of the tools. The tools have been on the market several years, and, in certain instances such as the large shipyards, they are being successfully and, in some cases extensively, employed. But for general use their adoption has been coming about rather slowly. Mr. Pressinger believes that in order to bring about a widespread use of the tools quickly it will be necessary to conduct extensive demonstrations, showing in actual practice what the tools will do.

With a view of attaining this end the company has begun to make arrangements to have its products exploited by means of demonstration, having already arranged to have men travel through the important countries and show the tools in operation. This missionary work will be carried on by the company in conjunction with its European agents. As an illustration of the faith which the latter are placing in this procedure, it might be stated that Schuchardt & Schutte, the company's German agents, immediately placed an order for 600 tools when arrangements were made to have a man demonstrate the tools in Germany.

While in England, Mr. Pressinger arranged a demonstration at the steel plant of Dorman Long & Co., at Middlesbrough, through the courtesy of Alfred Mosscrop, the manager of the plant. Mr. Mosscrop, by the way, is an American, having been in charge of the Rochester plant of the American Bridge Company. When he assumed charge of the Dorman Long plant he found that it was being operated without the use of compressed air. He immediately ordered a 1200-foot Franklin compressor and a full equipment of Chicago pneumatic tools. It was with this apparatus that the recent demonstration was made by Mr. Pressinger. That the exhibition created considerable interest is evidenced by the prominence of the concerns which sent representatives to witness it. In a number of cases the presidents or heads of the concerns attended in person. The party consisted of ten, and represented the following companies: Armstrong, Whitworth & Co.; Swan, Hunter & Wigham Richardson, Limited; Hawthorn Leslie & Co., Limited; North Eastern Railway Company; Robert Craggs & Sons, Limited; Northumberland Shipbuilding Company; Sir James Laing & Sons; J. L. Thompson & Sons, Limited; Scott & Mountain Limited. The spectators expressed great surprise at the remarkable performance of the tools, and it might be mentioned incidently that Dorman Long & Co. placed an order for three additional compressors and the necessary tools for operating their entire plant by means of compressed air. Those who witnessed this and similar demonstrations were so well pleased with what they saw, that Mr. Pressinger returned to New York with orders for 29 compressors and the accompanying tools.

In speaking of the general business situation in Europe Mr. Pressinger said that Germany is not only experiencing improved conditions, but seems to be preparing for a marked resumption of industrial activity. The shipyards are showing especial improvement, and the machinery builders are reaping a good harvest of orders from both the Russian and Japanese governments. The electrical industry is also gaining steadily. The other countries show a gradual improvement, but are still rather dull. Of these Italy may be said to be picking up more than any of the others.

A field which is practically entirely undeveloped is the stone industry. Special arrangements will be made to demonstrate the efficiency of pneumatic tools for cutting and working stone. The quarries of Scotland are expected to hold forth great possibilities along these lines.

At Fraserburgh, Scotland, the company have decided to build a plant which will be practically a duplicate of their "Boyer" plant in Chicago. It will be equipped with a large amount of American machinery and will produce the full line of Chicago tools. The specifications for the machinery equipment have not been prepared as yet.

Ernst Sachs of the firm of Fichtel & Sachs, Schweinfurt, Germany, is now in this country. One of the objects of his visit is to place an order for some $12,000 worth of automatic screw machines. These are to be used for extending the capacity of the German shop in connection with the manufacture of coaster brakes. Mr. Sachs is now in the West. He is making his headquarters with Schuchardt & Schutte, 120 Liberty street, New York.

Emil Zerkowitz of Budapest, Hungary, is in this country, and while here expects to place a large order for bolts and nuts. He is also investigating the subject of automatic machinery for the manufacture of thumb tacks. He is stopping at the Hotel Hungaria, Union square, New York.

An interesting announcement has been made in connection with power plant equipment matters. It is to the effect that the Brown-Corliss Engine Company of Corliss, Wis., has just opened a department for the building of high speed engines. The company announces that it will build high speed vertical engines in units from 25 to 500 horse-power, and is now working on orders for two units of 150 horse-power each, three of 250 horse-power each, two of 50 horse-power each and one of 75 horse-power. All of these engines will be direct connected to electric generators.

The International Acheson Graphite Company of Niagara Falls, N. Y., which, as we have previously noted, is building extensive additions to its plant, is now in the market for elevating and carrying machinery.

The following bids were opened July 19 for machine tools for the Eastern navy yards:

Bidder 1. Laidlaw-Dunn-Gordon Company, New York; informal, no guarantee.

2. Chicago Pneumatic Tool Company, New York.
3. J. R. Van Dyck Company, New York.
4. Manhattan Supply Company, New York.
5. Niles-Bement-Pond Company, New York.
6. S. A. Woods Machine Company, Boston.
7. The Garvin Machine Company, New York.
8. Pratt & Whitney Company, Hartford, Conn.
9. Smith-Courtney Company, Richmond, Va.
10. Drew Machinery Agency, Manchester, N. H.
11. The Walter H. Foster Company, New York.
12. Wm. E. Shipley, Philadelphia.
13. The Bullard Machine Tool Company, Bridgeport, Conn.
14. The Brown & Sharpe Mfg. Company, Providence, R. I.
15. A. J. Fisher, Chicago, Ill.
16. Handlan-Buck Mfg. Company, St. Louis, Mo.
17. Railway Appliance Company, Chicago, Ill.
18. Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.
19. Prentiss Tool & Supply Company, New York.
20. Crescent Machine Company, Leetonia, Ohio.
21. Sullivan Machinery Company, New York.
22. The Blaisdell Machinery Company, Bradford, Pa.
23. The Rand Drill Company, New York.
24. American Air Compressor Works, New York.
25. American Diamond Rock Drill Company, New York.
26. Manning, Maxwell & Moore, New York.
27. Becker-Brainard Milling Machine Company, Hyde Park, Mass.

28. Fairbanks Company, New York.
29. Oliver Machinery Company, Grand Rapids, Mich.
30. Motley, Green & Co., New York; informal, no guarantee.
31. Davis Caly Drill Company, New York.
32. General Electric Company, Schenectady, N. Y.

Class 1. One 14-inch by 10-foot back geared engine lathe—Bidder 8, $944; 9, $1094; 28, $1019.

Class 2. One engine lathe, triple geared, 34-inch swing, electrically driven—Bidder 5, $2490; 7, $2600; 11, $2388; 26, $2155; 28, $2555.

Class 3. One engine lathe, motor driven, 28 inches—Bidder 5, $1670; 7, $1485; 11, $1527; 26, $1500; 28, $1510.

Class 4. One single steam driven air compressor—Bidder 2, $989.02; 10, $1066; 15, $1400; 16, $833; 21, $1072; 22, $735, $785 and $835; 23, $845; 25, $850; 26, $980; 30, $1064.

Class 5. One cold saw cutting off machine, motor driven—Bidder 3, $1345; 17, $1546.

Class 6. One 36-inch by 6-inch motor driven grindstone—Bidder 5, $180, $210 and $165.

Class 7. One four-spindle multiple drilling machine, electrically driven—Bidder 5, $2000; 19, $2083; 26, $2270 and $2000; 27, $2425.

Class 8. For Guantanamo, Cuba, one drilling machine of 3000 feet capacity and 3005 feet drill rods, &c.—Bidder 31, $6836.75; 21, $9809.43 and $10,726.55; 25, $9996.45; 30. $9996.45.

Class 9. One horizontal and radial drill—Bidder 16, $299; 26, $324.

Class 10. One upright drill press—Bidder 5, $198; 7, $213; 16, $205; 26, $209; 28, $199.

Class 11. One upright drill press—Bidder 5, $288; 7, $245; 16, $258; 26, $269; 28, $255.

Class 12. One universal adjustable drill press—Bidder 26, $255.

Class 13. One milling machine, universal, electrically driven—Bidder 5, $1195; 12, $1112, $1165 and $1135; 14, $1444; 26, $1435; 27, $1099.

Class 14. One boring and turning mill, 30-inch, complete—Bidder 5, $1295; 13, $840; 19, $795; 26, $890.

Class 15. Iron work for one timber saw—Bidder 6, $400; 10, $174.

Class 16. Two circular saws, 36-inch diameter, solid tooth, two circular saws, 30-inch diameter—Bidder 4, $47; 10, $45.30; 20, $50; 30, $41.36.

Class 17. Two rotary converters—Bidder 32, $5225; 18, $5635.

New York.

NEW YORK, July 27, 1904.

Pig Iron.—The local market is a shade weaker, and sales are limited in volume. While Southern Irons are being quite firmly held and are offered only to a limited extent, some Northern Iron is pressing on the market. We quote for Northern brands, at tidewater, $14.75 to $15 for No. 1 Foundry, $14 to $14.50 for No. 2 Foundry and $13 to $13.25 for Gray Forge. Tennessee and Alabama brands are $13.25 to $13.50 for No. 2 and $12.75 to $13 for No. 3 Foundry.

Steel Rails.—Aside from a lot of 6000 tons for a Southwestern system no new business is reported. The report that the Wabash road has purchased 10,000 tons from the Pittsburgh mill is not confirmed, although it is true that the road has been in the market recently for the tonnage noted. Some fair orders have been placed in Light Rails, which we continue to quote $21.50 to $23.50, at tidewater.

Cast Iron Pipe.—The largest orders in sight at the moment run from 700 to 900 tons. The City of New York will purchase this week about 900 tons of 48-inch for the Jerome Park Reservoir. Small orders are fairly numerous, keeping the Eastern foundries quite well employed. Some of them, in fact, are oversold on medium sizes, and are in trouble for failure to make deliveries in the time agreed upon. Nevertheless, competition is sharp on all new business now coming out. Carload lots are quoted at $25.50 per gross ton for 6 to 10 inch and $25 for 12-inch, at tidewater, but desirable specifications or good tonnages secure lower rates.

Finished Iron and Steel.—The largest structural contract reported for the week covers the Steel construction of the Marshall Field warehouse in Chicago, calling for 5000 tons, which was taken by the American Bridge Company. Orders in this line are steadily picking up and inquiries continue to increase. A noteworthy feature is the reappearance of inquiries from manufacturing establishments in the vicinity of Pittsburgh contemplating improvements, which may eventually lead to considerable business. The railroad demand is still light. Other branches of the Finished Iron and Steel trades report quiet conditions, with unchanged prices. Eastern Bar Iron manufacturers held their usual monthly meeting last Thursday in this city and reaffirmed prices. We quote, at tidewater, as follows: Beams, Channels, Angles and Zees, 1.74½c. to 2c.; Tees, 1.79½c. to 2c.; Bulb Angles and Deck Beams, 1.84½c. to 2.05c. Sheared Plates in carload lots are 1.74½c. to 1.85c. for Tank, 1.84½c. to 2c. for Flange, 1.94½c. to 2.10c. for Marine and 1.94½c. to 2.50c. for Fire Box, according to specifications. Refined Bar Iron, 1.44½c. to 1.49½c.; Soft Steel Bars, 1.49½c.

Old Material.—While some dealers report no improvement in their trade, others appear to be more favored, and are taking a cheerful view of the situation. Among the sales of the week was a 1000-ton lot of Wrought Scrap. Prices of Old Steel Rails are a little stronger in this immediate vicinity, but in the interior low prices continue to be made, a sale of Rerolling Rails being reported at about $12.50, delivered at buyer's mill. Old Car Wheels are still neglected. Quotations per gross ton, New York and vicinity, are approximately as follows:

Old Iron Rails	$14.50 to $15.00
Old Steel Rails, long lengths	12.50 to 13.00
Old Steel Rails, short pieces	10.50 to 11.00
Relaying Rails	16.00 to 17.00
Old Car Wheels	10.00 to 11.00
Old Iron Car Axles	15.50 to 16.00
Old Steel Car Axles	14.00 to 14.50
Heavy Melting Steel Scrap	10.50 to 11.00
No. 1 Railroad Wrought Scrap	12.50 to 13.00
Iron Track Scrap	11.00 to 11.50
Wrought Pipe	7.50 to 8.00
Ordinary Light Iron	4.50 to 5.00
Cast Borings	4.00 to 4.50
Wrought Turnings	6.00 to 6.50
No. 1 Machinery Cast	10.50 to 11.00
Stove Plate	8.00 to 8.50

Patriarche & Bell, Steel merchants, 215 Pearl street, New York, carry in stock for prompt shipment an exceptionally large assortment of sizes of Best Spring Steel. In rounds the sizes advance by thirty-seconds of an inch from ⅛ to ⅜ inch; by sixteenths from ⅜ to 1 inch, and by eighths above 1 inch. In squares the sizes run by sixteenths of an inch from ⅛ to ⅝ inch; by eighths from ⅝ to 1¼ inches, and by quarters above 1¼ inches. The assortment of flats is very comprehensive, beginning with No. 19 gauge by 7-16 inch and running up to ½ inch by 5 inches, the intermediate sizes being graded by sixteenths, eighths or quarters of an inch, according to size.

Metal Market.

NEW YORK, July 27, 1904.

Pig Tin.—Although the market is very quiet and business is everywhere reported as being slow, prices have been gradually working upward. As has been the case throughout the present upward movement, the advances came from London, being immediately followed in this market. This market is in perfect sympathy with London so far as prices are concerned, despite local conditions. At the close to-day spot and July delivery were quoted here 26.87½c. to 27.05c., while August delivery could be had for 26.75c. The London market shows an advance of £2 10s. on spot and £2 2s. 6d. above the figures quoted last week. Present prices are £122 10s. for spot and £122 15s. for futures. The arrivals thus far this month aggregate 2103 tons, and about 2769 tons are now afloat.

Copper.—The market is still extremely quiet and without change or interesting feature. Lake is quoted 12.62½c. to 12.87½c.; Electrolytic, 12.50c. to 12.75c., and Casting, 12.37½c. to 12.50c. The London market shows a decline of 11 shillings 3 pence on spot, and 10 shillings on futures, being £57 to-day for both spot and futures. Best Selected has declined 5 shillings to £61. The exports for the month so far show 15,204 tons as a total, the week's shipments having amounted to about 4204 tons.

Pig Lead.—On Monday last the American Smelting & Refining Company reduced its price on shipment Lead. The price was dropped from 4.20c. to 4.10c. This is for Desilverized in lots of 50 tons or more, shipment within 30 days, Spot, ex-store, is quoted here 4.20c. to 4.25c. St. Louis quotes 4c. to 4.02½c., and London is unchanged at £11 13s. 9d.

Spelter.—The market is quiet and without change. Business is rather slow and prices are easy. Spot and July are quoted here 4.85c. to 4.95c. St. Louis has declined to 4.75c., and London has advanced to £22 7s. 6d.

Antimony.—The market is easy and unchanged. Hallett's is quoted at 7.25c., while Cookson's is 7c. to 7.25c., and other brands are quoted 6c. to 6.25c.

Nickel.—The usual amount of business is passing and prices are firm, large lots being quoted at 40c. to 45c. and smaller quantities at 50c. to 60c.

Quicksilver.—The market is quiet and lower, with ample stocks and a demand of moderate proportions. Flasks of 76½ lbs. have declined to $42.50. The London price has declined to £7 17s. 6d.

Tin Plates.—A reduction in price of 15c. per box has been made by the American Sheet & Tin Plate Company, the base price, f.o.b. mill, being reduced from $3.45 to $3.30. Adding freight, this brings the price of 14 x 20 100-lb. Cokes, New York delivery, to $3.49. It is reported in the trade that a change in discount has also been made, bringing the actual reduction to almost 20c. per box. The Welsh market is 3 pence higher than last week, being quoted 11 shillings 4½ pence, f.o.b. Swansea.

HARDWARE.

THE broadening of the term Hardware so as to include a larger variety of goods than formerly is a familiar feature of the trade. There is a disposition everywhere prevalent among enterprising Hardware merchants to carry in stock lines of goods which until recently were seldom if ever found in Hardware stores. This tendency is in some measure the result of the large increase in the number and kinds of articles offered to the public which have taken their place among the regular commodities contributing to the work or pleasure of life in these days, when human existence is so much more complicated than of old, and aided or encumbered, according to the point of view, by the presence of countless objects which in one way or another are supposed to contribute to well being and enjoyment. An interesting study would be furnished by an attempt to recall even in a cursory review the additions to the common articles of daily life made during the past half century. In every line of business the complexity of assortment is thus greatly increased, but in no branch is this more noticeable than in the Hardware and related fields.

In connection with this great increase in the commodities which merchants are permitted or, indeed, required to handle there has been a breaking down of the old lines by which one department of trade was separated from the others. The changes have, indeed, been such that some classes of merchants have altogether disappeared, but at the same time there has been a tendency to a widening of the assortment carried by merchants generally, and the encroaching on one another's field in a more marked degree than formerly. Of this the development of the department store is a striking example, but the effect of the same influence has been felt in practically every branch of business. Whether or not this is desirable is aside from our present purpose.

Ability to recognize the drift of things in the commercial world contributes greatly to success in business, and the wise merchant will be constantly on the alert to discover changes which are taking place, and passing upon the advisability of modifying his policy in any respect. In order to ascertain the facts in the case and to present them in a clear and definite form to the trade, we recently addressed an inquiry to all the Hardware merchants in Ohio with a view to eliciting information as to the lines of goods, outside of Hardware in the strict sense, which they are selling. The State of Ohio was selected as a central, progressive and representative State which in a general way might be taken as indicating the course of things in the country at large, although it must be borne in mind that the kinds of goods sold by merchants vary considerably in the different sections. The following table summarizes the reports thus received. The proportion of houses carrying the various lines named is indicated by the percentage given. Thus, 82 per cent. of the merchants whose reports are thus summarized are handling Glass, 7 per cent. Furniture, &c.:

Lines.	Per cent.
Glass	82
Furniture	7
Crockery and Glass Ware	15
Wooden Ware	65
Baby Carriages	14
Sewing Machines	34
Paints, Oils and Varnishes	89
Wagons and Carriages	43
Agricultural Implements	64
Agricultural Machinery	39
Paris Green	40
Stoves and Ranges	71
Plumbing, Heating, &c.	26
Tin Shop Work	37
Roofing and Cornice Work	40
Gas, Gasoline and Oil Stoves	70
Binder Twine	83
Clocks and Watches	15
Tin and Enameled Ware	76
House Furnishing Goods	47
Rope	90
Electrical Goods and Supplies	18
Lamps and Lamp Goods	28
Building Paper	81
Bicycles	34
Silver and Plated Ware	71
Field and Garden Seeds	29
Carpets and Oil Cloth	43
Wall Paper	4
Dairy Supplies	26
Sporting and Athletic Goods	52
Sash, Doors and Blinds	23
Gas Fixtures	24
Mill Supplies	25
Iron and Steel	69
Heavy Hardware	61
Photographers' Supplies	5
Harness and Whips	76
Phonographs	4
Stationery	11
Iron and Brass Bedsteads	9
Sewer and Drain Pipe	24

Condition of Trade.

The vacation period through which we are passing is causing the usual stagnation in trade, compared with other portions of the year, but in a large number of instances buyers, dealers and manufacturers speak confidently of a better feeling which has been distinctly noticeable in the past week or two. One manufacturer of Edge Tools, alluding to current orders, finds that while they are not large they are coming oftener, and in his line there is no tendency toward lower prices. While there have been some instances of tenderness in prices, in many cases the feeling is much firmer. The continuance of favorable crop conditions is a sustaining factor, especially as some crops are already assured. The consensus of trade opinion points increasingly to a satisfactory fall trade. While the various existing strikes are often alluded to by the timid as a menace, it must be remembered we always have more or less of them, and especially in good times, on the theory that labor is not getting its proportion of the profits. The immense orders for food and for war materials particularly, constantly being executed here for the combatants in the Far East, are both widening our market and familiarizing an alien people with our unrivaled facilities that will be remembered after the war is ended, as well as bringing in large amounts of foreign coin.

Chicago

Interviews with a large number of jobbers and retailers develop the general opinion that the sales for this month will exceed those of last July by a comfortable margin. It must be remembered, however, in this connection that last July was characterized by a decided slump in business and a general disposition on the part of buyers to delay purchasing until lower prices prevailed. The general feeling in this market this year is that prices will either remain stationary or will show some advance. There is, therefore, a disposition on the part of large buyers to take advantage of the present weakness in such lines as Nails and Wire products by ordering in goodly quantities of such products. This is stated to be particularly true of Cut Nails, and under the stimulus of this buying movement prices are already at least 5 cents a keg firmer than they were two weeks ago, more nearly approaching the "official" prices made by the association. Demand for Builders' Hardware is improving, particularly outside of the Cook County "high brick dead line." Jobbers profess to be well satisfied with the character and volume of orders received for fall goods, and already some inquiry is received for

Skates, Snow Shovels and similar strictly winter lines. Hardware business in general is brisker than the Heavy Iron and Steel lines, though the latter show some improvement.

NOTES ON PRICES.

Wire Nails.—A somewhat better demand has been noted during the week, with indications of a continuance of increase in this direction. Concessions of 5 to 10 cents per keg from the official quotations are not unusual. Regular quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95
Retailers, less than carload lots	2.05

New York.—The demand from nearby points is much better than in this city, owing to the comparatively small amount of building going on here. Quotations are as follows: Single carloads, $2.10; small lots from store, $2.20.

Chicago, by Telegraph.—A little better demand is evidenced, though price cutting below the official prices is still being done. Official prices are as follows, f.o.b. Chicago: Jobbers, carload lots, $2.05; retailers, car lots, $2.10; retailers, less than car lots, $2.20, though these prices are being shaded by independents and met when necessary. Coated Nails are quoted at $1.60 to $1.65 per keg to dealers or large consumers, delivered, Chicago.

Pittsburgh.—In the past week the demand for Wire Nails has shown a slight betterment and it is believed the volume of business from this time forward will be larger. As before noted in this report, concessions in prices of Wire Nails have been made for some time past, this amounting to about $2 a ton, or 10 cents a keg. We have therefore reduced our quotations and now quote as follows: Wire Nails, $1.80 in carloads to jobbers; $1.85 in carloads to retailers and $1.95 in small lots to retailers, all f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days, plus freight to point of delivery.

Cut Nails.—Large stocks at mills and a desire to reduce them have brought about a shading of regular quotations of 5 to 10 cents per keg which is quite general. Regular quotations are as follows for Steel and Iron Nails, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days.

	Base.
Jobbers, carload lots	$1.75
Jobbers, less than carloads	1.80
Retailers, less than carloads	1.90

New York.—During the past week or two the demand has been greater than the usual proportions with Wire Nails. As jobbers have been carrying somewhat limited stocks of Cut Nails, the increased demand has resulted in a temporary scarcity of the latter. Quotations are as follows: Carloads on dock, $1.89½; less than carloads on dock, $1.97½; small lots from store, $2.05.

Chicago, by Telegraph.—Prices are about $1 firmer than they were a week ago, bringing them that much closer to association prices, and $1.80 to $1.90, Chicago, is about the going price on carload lots, with 5 cents higher on less than car lots.

Pittsburgh.—The demand for Cut Nails is only fair, and as stocks at the mills are heavy there is more or less competition for the moderate amount of new business that is being placed. We quote Steel Cut Nails at $1.65 to $1.70, base, in carloads, maker's mill. Less than carloads are held at $1.70 to $1.75, terms 60 days, less 2 per cent. in 10 days.

Barb Wire.—Quite a general concession of from 5 to 10 cents per hundred pounds has followed the decrease in demand during the past few weeks. In the West a slight increase in demand is reported. Official quotations as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago, by Telegraph.—The demand is increasing somewhat, although it is naturally out of season for this commodity. Official prices are still held as follows: Car lots to jobbers, Painted Wire, $2.35; Galvanized, $2.65. To retailers, car lots, Painted, $2.40; Galvanized, $2.70. Retailers, less than car lots, Painted, $2.50; Galvanized, $2.80. Staples to jobbers, $2.25 for Plain; $2.60 for Galvanized. Staples to retailers, 5 cents higher. These prices are not being maintained absolutely.

Pittsburgh.—New business in Barb Wire continues light, the trade placing very few orders, while stocks held by the mills are heavy and there is considerable pressure to sell. The concessions in prices of Barb Wire referred to a number of times recently in this report amount to about $2 a ton, and this reduction is now being made quite generally by all the mills. We therefore reduce our prices on Barb Wire $2 a ton, and quote as follows:

	Painted.	Galv.
Jobbers, carloads	$2.10	$2.40
Retailers, carloads	2.15	2.45
Less than carloads	2.25	2.55

Smooth Fence Wire.—While a slightly better tone in the market is reported from some sections of the country, the demand is likely to remain light for some time. The desire on the part of mills to secure business causes a continuance of shading prices of 5 to 10 cents per 100 pounds from regular quotations. Official quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.80
Retailers, carloads	1.85
Less than carloads	1.95

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago, by Telegraph.—A little better tone is noted in the market. Official prices are as follows, f.o.b. Chicago: Smooth Fence Wire, Nos. 6 to 9, $1.95 per 100 pounds, in carload lots to jobbers; $2 per 100 pounds to retailers, and $2.10 in less than car lots. These prices are not being maintained regularly, but are shaded as occasion demands.

Pittsburgh.—The new demand is light and probably will be for a month or more. The mills are more or less anxious for business and have been shading prices about $2 a ton for the past month. We now reduce our quotations that amount and quote as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days: Plain Wire, $1.70, base, for Nos. 6 to 9, in carloads to jobbers, and $1.85 to $1.90 in small lots to retailers. Galvanized, 30 cents extra for Nos. 6 to 14.

Rope.—The feeling among manufacturers that business will continue in fair volume until fall, after which time the demand will be larger, still finds expression. The activity of the market should now be greater to correspond with general conditions in former years. Quotations on the basis of 7-16-inch diameter and larger are about as follows: Pure Manila, 11½ cents per pound; other grades of Manila, 10¼ to 11 cents, according to quality; pure Sisal, 9 cents; mixed Sisal, 7½ cents.

Binder Twine.—Prices in the West are reported to range from 9 to 10 cents for Sisal and standard by independent concerns, while the International Harvester Company is supposed to adhere to its original schedule. By those conversant with the trade it is thought that lower prices may be named before the end of the season.

Glass.—This is a time of numerous meetings and conventions among the various branches of the Window Glass trade, the endeavor being to put the badly demoralized market into better shape for fall business. In fact, it is rather difficult to keep the different associations clearly in mind. Reports are to the effect that the meeting of the proposed National Association of Window Glass Manufacturers, held at Put-in-Bay, Ohio, last week, was the largest attended of any of the meetings held, and that a permanent organization will be effected at the next meeting, which is to be held at Cleveland, Ohio, in August. The Producers' Window Glass Company is of-

fering Glass for sale at this point. The jobbers of American Window Glass in Chicago are to hold a meeting this week to consider the Glass situation in all its bearings and to try and find ways and means for bettering trade conditions. A new organization has been formed by the amalgamation of two of the Glass workers' organizations, which claims to include 96 per cent. of the workers in the country enrolled as members. Another workers' organization which is not included in the amalgamation has prepared a wage scale of its own and provides a date for starting Glass factories. This condition of affairs among the workers portends breakers ahead when it comes to a settlement of the wage scale and the date of starting factories with the manufacturers. The local market is without life. Jobbers quote small lots at 90 and 10 per cent. discount for the first three brackets and 90 and 15 per cent. discount for larger sizes.

Oils.—*Linseed Oil.*—Owing to the strong position of Seed, Linseed Oil was advanced 1 cent per gallon on the 25th inst. The demand is confined to small lots, large buyers refraining from purchasing at the recent advances. There has been considerably less Oil sold this season than for the corresponding time last year. Crushers, as a rule, are offering Oil only for prompt or 30 days' forward delivery. Quotations are as follows: City Raw, in lots of five barrels or more, 45 cents per gallon; in lots of less than five barrels, 46 cents per gallon; State and Western Raw, 43 to 44 cents per gallon. Boiled Oil, the usual 2 cents advance per gallon over Raw.

Spirits Turpentine.—During the early part of the week prices advanced ¼ cent, but have again fallen back to last week's quotation. Buying has been confined to small lots for immediate requirements. From the South reports show heavy receipts, but only moderate buying, with consequent increase in stocks. Quotations are as follows in this city, according to quantity: Oil barrels, 56½ to 57 cents; machine made barrels, 57 to 57½ cents.

MICHIGAN RETAIL HARDWARE DEALERS' ASSOCIATION.

THE tenth annual convention of the Michigan Retail Hardware Dealers' Association will be held at the Pantlind Hotel, Grand Rapids, August 10 and 11. A very interesting programme has been arranged, and the gathering promises to be a large and enjoyable one. During the convention papers or addresses on the following topics will be presented by the gentlemen named:

"The Retail Merchant as an Educator," by J. H. Whitney, Merrill.

"Our Social Relations," by C. L. Glasgow, Nashville.

"Some Points Which Contribute to the Successful Retailing of Hardware," by E. S. Roe, Buchanan.

"Capital and Credit: Its Use and Abuse in Our Daily Business," by A. K. Edwards, Kalamazoo.

"Collections," J. H. Murray, Cadillac.

"The Catalogue House Problem," by W. P. Bogardus, president of the National Retail Hardware Dealers' Association.

"Salesmanship as a Science," by A. F. Sheldon of the Sheldon School of Scientific Salesmanship, Chicago.

All of these topics, except the last, will be followed by general discussion. Perhaps the most interesting address will be that of Mr. Bogardus of the National Association, in view of the position occupied by the speaker and the topic, which is just now attracting more attention than any other in the trade.

It is understood that the Hardware manufacturers and jobbers of Grand Rapids are making arrangements to entertain the association, so that the social end of the convention will not be neglected. The Michigan Passenger Association have granted a round trip rate of one and a third fare on the certificate plan, provided 100 or more persons attend the meeting, a condition which doubtless will be easily met.

The officers of the association have decided to offer membership from now until December 31, 1904, for $2. The annual dues are $4, but it is felt that members who come in now will only derive the benefits of the association work for a few months and that a six months' rate would be a fair proposition. A. J. Scott, Marine City, the efficient secretary of the association, will be pleased to answer any inquiries concerning the coming meeting or other matters relating to the association.

AN IMPOSTOR IN PENNSYLVANIA.

ANOTHER impostor, or perhaps it is the same genial and suave individual to whose operations we have already directed attention, has turned up in Pennsylvania, Erie being the site of his most recent escapades. Here he represented himself during visits to several manufacturers as "Robert E. Wells" of the Marshall-Wells Hardware Company of Duluth, Minn. On communication with the company the Erie manufacturers discovered that no person of that name was connected with the company, who promptly branded the visitor as a fraud. Manufacturers and merchants, too, will do well when approached for funds by strangers of persuasive address to look carefully into their credentials before handing over the desired "advance." It is safe to say that in most cases the business connection claimed by the visitor will be repudiated on investigation.

The party who worked the game at Erie, one of the manufacturers cashing his draft to the tune of $75, is described as a man apparently about 50 years of age, weight about 175 pounds, 5 feet 7 inches in hight, dark complexion with smooth shaven face, and seemed to be very well posted as to the Hardware business.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses:*

FROM C. E. WILHELM, Marvin, Ohio, who has lately embarked in the Hardware, Stove, Tinware and Sporting Goods business in Marion, Ohio.

FROM GEO. E. WHITNEY, Lane, S. D., who has just commenced the General Hardware and Harness business.

FROM J. W. BALLEW, Marshall, Mo., who has succeeded B. F. Naylor Hardware & Furniture Company.

FROM W. L. DOYAL, Iredell, Texas, who has succeeded Doyal & Detherage in the Hardware business.

FROM CHAS. E. WAITE, Hutchinson, Kan., who is successor to Waite & Innes in the Hardware, Stove and Sporting Goods business.

FROM J. E. SMITH, Nashville, Ark., who has succeeded Smith & Mulkey in Hardware, Stoves, Agricultural Implements, furniture, &c.

TRADE ITEMS.

UNDER the name of the American Buying Company, not incorporated, George A. Bushnell, who was for nearly 20 years manager of the George Tritch Hardware Company, Denver, Col., has established an office in the Ceylon Building, Lake street and Wabash avenue, Chicago. Mr. Bushnell's plan is to attend to the buying for a number of the larger retail Hardware dealers, going direct to the manufacturer with combination orders from his various customers, which shall have sufficient magnitude to command the lowest prices. He states that he has already 50 subscribers and the list is growing.

AT the annual meeting of the stockholders of the Eagle Lock Company, held at the office of the corporation in Terryville, Conn., on July 26, the following were elected as directors for the ensuing year: R. J. Plumb, Terryville; H. B. Plumb, Brooklyn; H. L. Balch, New York; F. P. Wilcox, New York; W. T. Woodruff, Thomaston; O. B. Hough, Terryville, and A. E. Hart, Hartford. Subsequently the directors elected the following officers: President and treasurer, R. J. Plumb; secretary, H. B. Plumb. There was a comparatively small attendance of stockholders, although a large proportion of the stock was represented by proxies.

THE CATALOGUE HOUSE QUESTION.

CATALOGUE PRICES ON MISCELLANEOUS HARDWARE.

WE supplement with the following digest the statement of catalogue house prices on common goods which was given in *The Iron Age*, July 14. The quotations in the following columns are those of another prominent catalogue house and will be of interest to the trade as representing the prices at which the goods named are offered to the general public. The manner in which they compare with the Hardware merchant's prices will be an interesting and profitable subject for investigation.

Hard Wood Lemon Squeezers, each.....$0.07
Round Head Clothes Pins, per box, 30 doz..... .40
Bread or Pastry Boards:
16 x 22 in., each.....$0.23
18 x 24 " " ..... .26
20 x 27 " " ..... .29
20 x 30 " " ..... .33
One-Knife Slaw Cutters, each..... .12
Kraut Cutters, 2-Knife, Slide Box, each..... .80
" " 3- " " " " 1.50
Ironing Boards, Poplar Wood:
3 ft., each.....$0.22
4 " " ..... .25
4½ " " ..... .30
5 " " ..... .40
5½ " " ..... .45
6 " " ..... .47
Malleable Iron Clamps:

Opens	4 in.	(1½ lbs.)	doz.	$1.58	each	$0.14
"	5 "	(1¾ ")	"	1.90	"	.17
"	6 "	(2 ")	"	2.44	"	.22
"	7 "	(3 ")	"	2.93	"	.26
"	8 "	(3¼ ")	"	3.38	"	.30
"	10 "	(5¼ ")	"	4.18	"	.40

Solid Box Blacksmiths' Vises, Cast Steel Jaws:
35 lbs., each.....$3.80
40 " " 3.99
45 " " 4.18
50 " " 4.37
55 " " 4.56
60 " " 4.94
65 " " 5.32
70 " " 5.70
75 " " 6.08
American Wrought Anvils:
85 lbs. up, per lb.....$0.08
70 to 79 lbs., per lb..... .08½
60 " 69 " " " ..... .09
50 " 59 " " " ..... .10
40 " 49 " " " ..... .11
Peter Wright's Anvils:
85 to 500 lbs., per lb.....$0.10½
71 " 84 " " " ..... .11½
61 " 70 " " " ..... .12½
50 " 60 " " " ..... .13
50 lbs. and lighter, per lb..... .14
Carriage Bolts:

¼ *in. diameter.*

Inch.	Per 100.	Per doz.
1¼	$0.33	$0.04
1½	.34	.04
1¾	.35	.05
2	.36	.05
2¼	.37	.06
2½	.38	.06
2¾	.40	.06
3	.42	.07
3¼	.44	.07
3½	.45	.07
3¾	.46	.07
4	.47	.07
4½	.49	.07
5	.53	.08
5½	.55	.08
6	.58	.08
7	.62	.08
8	.66	.08

5-16 *in. diameter.*

Inch.	Per 100.	Per doz.
1¼	$0.40	$0.06
1½	.41	.06
1¾	.42	.06
2	.43	.06
2¼	.46	.07
2½	.47	.07
2¾	.50	.07
3	.51	.07
3¼	.52	.08
3½	.53	.08
3¾	.55	.08
4	.57	.08
4¼	.58	.08
4½	.60	.09
5	.62	.09
5½	.64	.09
6	.70	.09
6½	.72	.12
7	.76	.12
7½	.80	.12
8	.83	.14
9	.90	.14
10	.96	.15

Wrought Iron Washers:
¼ in. Bolt, 139 to lb., per lb.....$0.07½
5-16 " " 113 " " " ..... .06½
⅜ " " 55 " " " ..... .05¾
½ " " 20 " " " ..... .04¼
¾ " " 10 " " " ..... .04
⅞ " " 9 " " " ..... .04
1 " " 5 " " " ..... .04
Round Head Stove Bolts:

3-16 *in. diameter.*

Length.....	1-2	5-8	3-4	7-8	1	1¼ in.
Per doz.....	$0.03	.03	.03	.03	.03	.04
Per 100.....	.21	.21	.22	.22	.23	.23
Length.....	1½	1¾	2	2½	3 in.	
Per doz.....	$0.05	.05	.05	.05	.05	
Per 100.....	.25	.26	.27	.28	.31	

¼ *in. diameter.*

Length.....	1-2	5-8	3-4	7-8	1	1¼ in.
Per doz.....	$0.04	.04	.04	.04	.04	.05
Per 100.....	.25	.25	.25	.28	.28	.28
Length.....	1½	1¾	2	2½	3 in.	
Per doz.....	$0.05	.05	.06	.06	.06	
Per 100.....	.30	.31	.33	.35	.38	

5-16 *in. diameter.*

Length.....	1-2	5-8	3-4	7-8	1	1¼ in.
Per doz.....	$0.07	.07	.07	.07	.07	.08
Per 100.....	.40	.40	.40	.41	.43	.45
Length.....	1½	1¾	2	2½	3 in.	
Per doz.....	$0.08	.08	.09	.09	.10	
Per 100.....	.48	.50	.53	.58	.64	

Machine Bolts:

¼ *in.*

Length.	Per 100.	Per doz.
1½	$0.52	$0.08
2	.55	.08
2¼	.58	.09
2½	.61	.09
3	.63	.09
3½	.65	.09
4	.67	.10
4½	.70	.10
5	.72	.10
5½	.74	.10
6	.76	.11
6½	.78	.11
7	.80	.12

⅜ *in.*

1½	$0.74	$0.10
2	.80	.11
2¼	.83	.12
2½	.86	.13
3	.89	.14
3½	.94	.17
4	.99	.18
4½	1.05	.20
5	1.10	.21
5½	1.16	.22
6	1.19	.22
6½	1.24	.22
7	1.29	.23
7½	1.35	.23
8	1.39	.24

5-16 *in.*

Length.	Per 100.	Per doz.
1½	$0.62	$0.09
2	.66	.09
2½	.68	.09
2¾	.69	.10
3	.74	.10
3½	.76	.11
4	.79	.11
4½	.83	.12
5	.87	.13
5½	.93	.14
6	.95	.16
6½	.99	.17
7	1.11	.18

½ *in.*

1½	$1.11	$0.20
2	1.20	.20
2¼	1.25	.21
2½	1.28	.22
3	1.36	.23
3½	1.47	.24
4	1.55	.25
4½	1.63	.26
5	1.67	.27
5½	1.75	.28
6	1.89	.29
6½	1.97	.33
7	2.00	.35
8	2.17	.36
9	2.33	.37
10	2.50	.39
11	2.65	.41
12	2.80	.43
14	2.90	.44
16	3.13	.46

Cable Log Chains:

Inch	1-4	5-16	3-8	1-2
Approximate weight, lbs.	10¾	16	22½	40
Each	$0.70	.90	1.00	1.60

Steel Cable Chain, Short, Straight Link:

Size.	Proof test. Pounds.	Approximate weight per foot.	Price per lb.
3-16	700	8 oz.	$0.09¼
1-4	1,200	12 oz.	.06¾
5-16	2,500	15 oz.	.05¾
3-8	3,500	1 lb. 5 oz.	.04¾
7-16	4,800	2½ lb.	.04¼
1-2	6,200	2 lb. 6 oz.	.04⅛

Lag or Coach Screws, Square Head:

5-16 *in. diameter.*			⅜ *in. diameter.*			½ *in. diameter.*		
Length.	Per doz.	Per 100.	Length.	Per doz.	Per 100.	Length.	Per doz.	Per 100.
1½ ..	$0.09	$0.59	1½ ..	$0.11	$0.69	1½ ..	$0.15	$0.97
2 ..	.10	.64	2 ..	.12	.76	2 ..	.17	1.07
2½ ..	.12	.69	2½ ..	.14	.82	2½ ..	.19	1.15
3 ..	.13	.74	3 ..	.16	.89	3 ..	.21	1.25
3½ ..	.14	.77	3½ ..	.17	.97	3½ ..	.23	1.34
4 ..	.15	.84	4 ..	.18	1.03	4 ..	.25	1.43
4½ ..	.16	.89	4½ ..	.19	1.10	4½ ..	.26	1.54
5 ..	.17	.94	5 ..	.20	1.18	5 ..	.27	1.60
5½ ..	.18	1.00	5½ ..	.22	1.23	5½ ..	.28	1.71
6 ..	.19	1.02	6 ..	.24	1.30	6 ..	.29	1.80
						7 ..	.30	1.98
						8 ..	.32	2.18
						9 ..	.35	2.35
						10 ..	.38	2.54
						11 ..	.40	2.75
						12 ..	.43	3.00

Agricultural Wrenches:

Inch	8	10	12	15
Each	$0.20	.24	.28	.48

Alligator Wrenches:

Inch	9	16	22
Takes Pipe	⅜ to ¾	½ to 1	1½ to 2
Each	$0.28	.55	.80

Stebbins' Molasses Gates:

No.	1	2	3	4	5
Bore	1	1⅛	1⅜	1⅝	1¾
Each	$0.13	.15	.17	.18	.22

Hose Bibs Screwed for Iron Pipe, Lever Handle, Finished:

Inch	1-2	3-4	1
Each	$0.54	.77	1.23

Compression Hose Bibs with Shoulder, Screwed for Iron Pipe, Finished:

Inch	1-2	3-4	1
Each	$0.40	.58	1.15

Compression Plain Bibs, Screwed for Iron Pipe, with Shoulder, Finished:

Inch	1-2	3-4	1
Each	$0.33	.54	1.07

Fuller Pattern Plain Bibs, for Iron Pipe, Finished Brass:

Inch	1-2	3-4	1
Each	$0.44	.62	.85

Fuller Pattern Hose Bibbs, for Iron Pipe, Finished Brass:

Inch	1-2	3-4	1
Each	$0.52	.70	.90

Frary's Patent Oil Faucets, Japanned Iron, Brass Lever Handle, Screwed Shank:

Inch	1-2	5-8	1
Each	$0.23	.25	.30

Loose Key Oil Faucets to Screw, Brass:

1-2 inch, each.....$0.45

Socket Firmer Chisels:

Inch	1-4	3-8	1-2	5-8	3-4	7-8
Each	$0.20	.22	.24	.27	.28	.29
Inch	1	1¼	1½	1¾	2	
Each	$0.32	.33	.34	.37	.39	

Per set, 11 Chisels, ¼ to 2 inch.....$3.10

Socket Framing Chisels:

Inch	3-8	1-2	3-4	1	1¼	1½	1¾	2
Each	$0.30	.31	.35	.40	.46	.51	.56	.61

Chisel Handles:

	Doz.	Each.
Tanged, Hickory, Brass Ferrules, assorted, 6 sizes	$0.18	$0.02
Socket Firmer, Polished	.15	.02
Socket Framing, Hickory, Polished, Iron Ferrules	.25	.03
Fiber Head, Tanged Firmer, Polished, assorted sizes	.58	.05
Fiber Head, Socket Firmer, Polished, assorted sizes	.47	.04
Leather Head, Hard Wood, Polished, Tanged Firmer, assorted sizes	.42	.05
Leather Head, Socket Firmer, Polished, assorted sizes	.32	.04
Leather Head, Socket Framing, Polished, assorted sizes	.39	.04

Jennings' Pattern Auger Bits:

Inch	1-4	5-16	3-8	7-16	1-2
Each	$0.11	.13	.15	.17	.18
Inch	9-16	5-8	11-16	3-4	13-16
Each	$0.19	.21	.23	.25	.27
Inch	7-8	15-16	16-16	18-16	20-16
Each	$0.29	.32	.34	.39	.43

Double Spur Auger Bits:

Inch	3-16	1-4 to 7-16	1-2 & 9-16	5-8
Each	$0.11	.10	.11	.12

Inch	11-16	3-4	13-16	7-8
Each	$0.14	.15	.16	.18
Inch	15-16	16-16	18-16	
Each	$0.20	.22	.28	

Ship Auger Bits, 4 to 6 in. twist, with or without Screw:

Inch	1-4 & 5-16	3-8 to 1-2	9-16	5-8
Each	$0.26	.27	.33	.34
Inch	11-16	12-16	13-16	
Each	$0.40	.41	.47	
Inch	14-16	15-16	16-16	
Each	$0.48	.54	.55	

Straight Trimmers, Nickel Plated:

Inch	6½	7½	8½	10
Each	$0.55	.62	.70	.90

Bent Trimmers, Nickel Plated:

Inch	7	8	9
Each	$0.60	.70	.90

Barber Shears, Full Nickel Plated:

Inch	7½	8	8½
Each	$0.60	.70	.75

Straight Trimmers, Laid Steel Blades, Full Nickel Plated:

Inch	6	7	7½	8	9	10
Each	$0.35	.40	.45	.50	.55	.65

Straight Trimmers, Laid Steel Blades, Japanned Handles, Warranted:

Inch	6	7	8	9
Each	$0.25	.30	.35	.45

Paper Hangers' or Bankers' Shears, Laid Steel Blades, Japanned Handles:

Inch	12	14
Each	$0.70	.75

Combined Kitchen Saw and Bread Knife, 11 in. Blade:

Each.....$0.09

Cocoa Handle Butcher Knives, Fancy Bolster, Capped End:

Inch	6	7	8
Each	$0.33	.39	.47

Cocoa Handle Butcher Knives, Single Bolster:

Inch	6	7	8
Each	$0.25	.33	.40

Butcher Knives, Polished Handles, Brass Saw Rivets:

Inch	6	7	8
Boxwood	$0.30	.32	.40
Cocoa	.33	.35	.44
Ebony	.36	.40	.48

LETTERS FROM MERCHANTS.

We have received many letters touching upon the different phases of the catalogue house question, and presenting a wide diversity of view in regard to the attitude and duty of the trade toward it. Several correspondents emphasize the necessity of retailers getting close to manufacturers and buying at something like the prices paid by the catalogue houses. The point is also made by some merchants that the catalogue houses are, after all, retailers, and that the manufacturers should sell them, if at all, at the same prices as are paid by good retail merchants. Another letter tells how, in a practical way, an Ohio merchant made an appeal to the public, with a view to keeping trade at home, instead of sending orders to houses that have no local interests.

REPLY TO A LETTER IN THE IRON AGE, JULY 14.

From A Long Established Retail House in New England: That letter in *The Iron Age* of the 14th inst., in which a merchant gives prices he paid to jobbers for goods, and also the published catalogue house prices on the same, made us laugh. He asks at end, Should not retail dealers buy of manufacturers? We should say Yes, decidedly, if they hope to compete with the catalogue houses. He reaches the right conclusion. On many goods he can, if well posted, in time get same prices as jobbers; not on all, but on many goods. The jobbers have to get a profit of over 10 per cent. (on many goods they get 20 and more). They have, too, to cover expenses. We were amused that your correspondent should think that he could buy of jobbers and not find that lower prices than he pays are quoted by catalogue houses. On many goods it cannot be done, in our opinion.

How to Meet Competition.

Carry a good assortment of goods, buy everything liable to be called for, sell at reasonable profits, keep goods and store in good order, advertise in local papers, keep show windows in good order, changing the goods in

them often, use every one fairly, buy as largely as possible of the manufacturer to save jobber's profit, and we think the competition of catalogue houses can be met. These houses have come to stay. They must be met like any other competitors. Our experience of 40 years is that there is always some way to meet competition of any sort; we have always been able to take care of it in one way or another.

TREAT THE CATALOGUE HOUSE AS A RETAILER.

FROM A MERCHANT IN IOWA: I notice in your issue of June 30 a letter from a Connecticut merchant about meeting catalogue house prices. I think he hits the nail squarely on the head, and all it needs is driving home, and its home is the manufacturer. If the manufacturer would treat the catalogue house as an ordinary retailer—that is, protect the jobber, and incidentally the retailer—it would be no trouble for us small retailers to compete. I have been in the Hardware business 30 years in one location, and in all that time have not been able to get goods from manufacturers cheaper than from jobbers. If I thought the catalogue house way of distributing goods was the best for all the people I would say, let it go that way and let us that stand in the way get out and go to work at something else.

However, the old way of doing business through jobber and retailer has grown from necessity, and to me it seems the most convenient for all. The final outcome if the catalogue house method prevails would seem to be no retailers in the small town, which would be a very awkward way of getting what we want.

MAIL BAGS FULL OF CATALOGUES AND CIRCULARS.

FROM A NEBRASKA HARDWARE MERCHANT: I am heartily in sympathy with you in your stand on the catalogue house proposition, for I am postmaster here and know full well what their competition means, for I see the outgoing money orders sent in payment for goods and see their catalogues and circulars coming in by the bag full. I also fully realize they are selling numerous items at retail for less than I can buy them at wholesale. This shows that something is radically wrong somewhere.

JOBBERS' ORDERS SMALLER THAN THOSE OF CATALOGUE HOUSES.

FROM A MANUFACTURER IN NEW JERSEY: Within a day or two I received a letter from one of the largest jobbing Hardware houses in the West asking me the question squarely if I sell to catalogue houses, and, if I do, whether I intend to continue to sell them.

I presume that means that if I do the Hardware jobber will drop me. It happens I am selling more than twice as much to one catalogue house as I am selling to this large jobber, not to speak of another catalogue house.

CATALOGUE HOUSES HAVE NO LOCAL INTERESTS.

FROM AN OHIO MERCHANT: I had the following appeal printed and put them in the packages of my customers who have dealings with catalogue houses:

LOOK HERE.

When you get a catalogue from a big mail order house, just look it over and see what they will pay for your produce; also investigate and see what their terms of credit are in case you do not have the ready cash; how much they will give toward the keeping up of the sidewalks; just write them and ask them how much they will give toward the erection of a church; how much they will give to assist the poor. After you have done this and received a reply see if your home merchant won't do as well.

I also gave a dozen or more to each merchant in town and told them to put them in packages and hang in their windows. I have them conspicuously placed in our own windows and one pasted on the under side of the glass of our showcase. When we give out change we always put it directly over the paper so that the customer cannot help reading it.

Z. T. Miller, formerly president of the Illinois and National Retail Hardware Dealers' Associations, has written a pamphlet which he entitles, "Dawn, or The Solution of the Catalogue House Problem." Mr. Miller in his pamphlet reviews the evolution of the catalogue house and credits its success and growth largely to the grange movement which started some 40 years ago. He considers catalogue house competition and other serious problems which menace the dealer's welfare as results of excessive commercialism, in which is included excessive competition, both in production and selling, too many manufacturers engaging in the same line of business; too many traveling salesmen endeavoring to sell their goods; too many jobbers competing with each other; and too many retailers in a given community, all tending to increase the cost of the finished article to the consumer because of the excessive costs and profits intervening between the manufacturer and the consumer. The pamphlet treats the whole problem from a broadly philosophic standpoint, including the bearing upon it of the attitude of organized labor and the influence of trusts and the tariff. Mr. Miller believes that he has a solution of many present evils and invites correspondence. His address is 100 Lake street, Chicago.

THE FERROKRAFT COMPANY.

WM. M. POWELL of Cleveland, Ohio, formerly, for several years manager of the Ferrosteel Company of that city, manufacturers of Registers, and later organizer and secretary and treasurer of the Columbian Hardware Company, also of Cleveland, his interest in which was disposed of some time since, has organized the Ferrokraft Company, successor to the patents and good will of the Universal Fastener Company. The business of the latter company, including the manufacture of the Stevens Automatic Springless Catch, will be continued by the new organization, who will also add other lines of Hardware specialties, including a new Stevens Catch. As the name of the company implies, its employees are expert metal workers in Iron, Steel, Brass, Bronze and other metals.

SAMUEL WINSLOW SKATE MFG. COMPANY.

THE SAMUEL WINSLOW SKATE MFG. COMPANY, Worcester, Mass., will get out no radically new Skate this season, but will push its existing lines, paying particular attention to the Hockey Skate, for which there is an ever increasing demand. The Winslow Company introduced this Skate into the United States several years ago, and have given it various modifications to meet the demand, which is somewhat different from that in Canada, where the Hockey Skate had its origin. The American trade began in a small way, but it has grown very rapidly, as skaters learned of the advantages of this type of Skate. The Canadian Hockey Skate screws on the shoe and is never taken off, the skater giving up one pair of shoes to this purpose. But in the United States, where skating is so much more uncertain, and where there are fewer rinks outside of some of the larger cities, the Skate manufacturer has to meet the calls of those who do not wish to give up a pair of shoes to the purpose of skating. Consequently a variety of attachments are provided, by means of which the Skate may be quickly and securely fastened to the shoe and as quickly removed.

ON August 1 the general and executive offices of the National Wire Corporation will be removed from New Haven, Conn., to their new York branch, in the Engineering Building, 114 and 116 Liberty street, from which date the business of the corporation—sales, buying, accounting, collecting, &c.—will be conducted in New York City. Private wires, both telephone and telegraph, connect the New York offices with the New Haven mills, 77 miles away, so that the company feels that on the whole it will be able to conduct its business to better advantage than has heretofore been the case.

FACTORY COST AND BUSINESS METHODS.

ENCOURAGING EMPLOYEES TO MAKE SUGGESTIONS.

We are indebted to the Moline Plow Company, Moline, Ill., which is a large manufacturer of Agricultural Implements, for the following advices in regard to its system of awarding prizes for suggestions from its employees:

THE two announcements in regard to the plan, which are reproduced below, were distributed to the employees by placing them in pay envelopes.

Form No. 1 was sent out about December, 1902, at which time the company inaugurated the plan. The large posters referred to therein contained further announcements of the matter, with the amount of prizes. These posters were displayed in various portions of the factory. Form No. 2 was published about September, 1903, at the beginning of the succeeding manufacturing season.

To our Employees:

With your active help, we propose trying a method which has been used with good results in other factories. It is as follows:

We want every employee to think carefully, especially of his immediate surroundings, to see if he cannot suggest some improvement which will save money in manufacturing, either by cheapening the present methods, increasing the capacity, the saving of material, the avoiding waste, delays, &c., or which will produce better results either in quality or quantity of goods, and in workmanship or finish, present costs being considered.

These acts on your part will serve to strengthen the friendly feeling which has always existed between the office and the shop, and will give you all a chance to be heard, and the most able or the most fortunate ones a chance to cash some of their bright ideas.

One man may win as many prizes as his suggestions warrant.

Please make all suggestions in writing, signing your name thereto, after you have thought the subjects over carefully, and deposit them in boxes supplied for the purpose placed at the pay windows and marked "Suggestions."

The boxes will be opened March 1st, and the prizes will be awarded March 15th. The large posters about the shop mention the prizes.

If this plan works well and has your earnest support, we will try it several times each year hereafter.

Very truly your friends,
MOLINE PLOW COMPANY.

FORM NO. 1.

The company just finished the last of five prize distributions, the period of each amounting to about three months. The prizes amounted to $150 for each period, half being distributed to the foremen and the other half to other employees. The amounts in each case were:

First prize	$25
Second prize	20
Third prize	15
Fourth prize	10
Fifth prize	5

Suggestions Collected Weekly

Originally the suggestions were held until the close of the prize period, when they were examined by the executive force of the superintendent's office and awards made immediately. It was found, however, that a better plan would be to prove by actual use the value of the various suggestions, and the plan was adopted of collecting the suggestions weekly and putting such as seemed practicable to an actual test. Then at the close of the prize period the entire series of suggestions were again examined, and the awards were based on what evidence had been secured by a trial of the matters contained therein.

The number of suggestions submitted at each period varied in the neighborhood of from 60 to 100. Quite a number of these were such as had already been considered by heads of departments and found impracticable for actual use, though they may have been original with the men submitting them. A numbers of others showed careless thought on the part of the workmen making the suggestions, though in a number of instances they furnished ideas to the management. It was found that certain of the men, both foremen and workmen, were always in the list of those making suggestions at each period. A considerable number of others would make one or perhaps two efforts and stop. The company was unable to get suggestions from by far the greater proportion of the men employed.

To our Employees:

A trial of the suggestion matter during the past season develops the following regulations as necessary to the proper carrying out of the idea:

1. Care should be taken to date each communication and sign with name and check number.

2. Suggestions should be handed in as early as possible, after they have been carefully studied out, as it is necessary to learn their value before awarding prizes.

3. The suggestion box will be opened once a week, the suggestions considered at once and such as seem practicable will be tested by use.

4. Only such suggestions as are original, and are capable of being put to a practical use by the company, will be considered in awarding prizes.

The management desires, in a spirit of fairness, to base these awards solely upon the value to the company of the idea suggested, and invites your further co-operation.

Very truly yours,
MOLINE PLOW COMPANY.

FORM NO. 2.

Stimulating Thought

There is no doubt that the general effect of the system has been to stimulate original thought on the part of quite a number of the men, to the benefit of the company. There has been an increased tendency on the part of employees to talk with the management over matters relating to their work. It is believed by the company that the success of such a system depends upon the ability to interest a considerable percentage of the force employed, and as an aid in accomplishing this they should be promptly advised of receipt and disposition of their various suggestions, with reasons given, if possible, why these suggestions are valuable or not. Much interest may be lost by a failure to supply such information as will enable employees to follow the workings of the system. A plan might be proposed for trial involving the payment as a prize of a fixed nominal amount for each suggestion submitted which could be used, these suggestions being reconsidered at the end of a certain period, or at the close of the season, and reclassified for the award of what might be termed the grand prizes.

Prize for Each Suggestion

THE citizens of Asheville, N. C., are already making efforts to secure the holding of the simultaneous conventions of the Southern Hardware Jobbers' Association and the American Hardware Manufacturers' Association of 1905 in their city. Asheville has many attractions to offer, and they will doubtless be submitted to the gentlemen charged with the selection of place of meeting with tact and impressiveness.

THE business of H. B. Leonard & Co., Somerset, Mass., manufacturers of Brilliant Metal Polish, has been taken over by the F. M. Trafton Company. Mr. Trafton, for whom the company is named, was formerly copartner and treasurer of H. B. Leonard & Co. The change in ownership of the business resulted from the death of H. B. Leonard.

DEATH OF THOMAS W MUNROE.

THE death of Thomas W. Munroe, secretary and manager of the Allerton-Clarke Company, New York, July 25, by shooting himself at his home in Brooklyn, was a severe shock to both business and social acquaintances. The only plausible explanation of the rash act, it is very generally agreed, was an impairment of his mental faculties, which, under the stress of real or fancied business worries, has been developing for some time. This condition was further augmented by the strain incidental to the critical illness of a favorite daughter within the past two weeks, who he believed was threatened with appendicitis, and with whom he had watched night and day. The inaccurate and sensational articles which have appeared in some of the daily newspapers contained in the main but a trace of actual fact, this being especially true of the excessive amounts of life insurance said to have been carried by him and the em-

THOMAS W. MUNROE.

barrassment caused by premiums nearly due. Those who have known him intimately for years, even as boys, recall changes in his demeanor that attracted little attention at the time, and it is also remembered that his aged father died of melancholia. There was evidently some premeditation, as is evidenced by a somewhat rambling note found on his person after the occurrence, the contents of which tend to confirm impressions of failing mind.

Thomas W. Munroe was the son of Richard Munroe, who for over 30 years was a valued and trusted employee of A. T. Stewart, and a legatee by the great merchant's will for long and faithful service. He was born in New York, January 22, 1854, not far from Stuyvesant square, and was educated at Public School No. 35, the school noted for having graduated so many prominent New Yorkers, now leaders in its mercantile, financial, judicial and governmental affairs, the alumni of which organized in 1897 the Thomas Hunter Association, in honor of their respected principal.

Mr. Munroe began his business life with Theodore W. Mace at 116 Chambers street, manufacturers' representative in Mechanics' Tools. From there he went to Hart, Bliven & Mead Mfg. Company, about July 1, 1870, remaining with the house until it went out of business in 1878, when he entered the employ of Thomas Chalmers, for whom he was head traveling salesman for five years. Having married while with the latter house, he grew tired of traveling and went with C. F. Guyon, a former fellow clerk in Hart, Bliven & Mead, and who then represented the Reading Hardware Company in New York. On the organization of the C. F. Guyon Company, after the Reading Hardware Company established its own branch here, Mr. Munroe became its secretary. With the failure of the Guyon Company in the panic of 1893 he became the secretary and manager of the newly organized Allerton-Clarke Company, where he remained until his decease.

Mr. Munroe was very domestic in his habits, spending all his spare time with his family, which was a happy one. He was a faithful and tender husband, a loving father, and of exemplary habits; refined, cultured, companionable and always ready to sympathize with or aid a friend. The sad circumstances of his death will be deplored by hosts of warm friends and acquaintances. He belonged to no clubs, but was a veteran of Company G, Twenty-third Regiment, N. Y. N. G., and a member of Doric Lodge, F. and A. M. He is survived by a widow and two daughters.

CONTENTS.

	PAGE.
The Walker Tool Room Grinder No. 2. Illustrated	1
The Inland Company's Sheet Mill Closed Indefinitely	4
Census Report on the Mica Industry	5
Pumping and Air Compressing Machinery at the St. Louis Exposition.—II. Illustrated	6
Magnetite in Alabama	10
Tod Rolling Mill Engines. Illustrated	11
Panama Canal Contracts	17
A New Departure in Scotch Warrants	18
The Pacific Coast Outlook	20
Proposed North Channel of Chicago Drainage Canal	21
The Gould & Eberhardt Draw Bench. Illustrated	21
The Demurrage Question	21
The Mueller Multiple Spindle Drilling Attachment for Radial Drills. Illustrated	22
The Eight-Hour Inquiry	22
New Publications	23
Editorial:	
The Iron Age Index	24
The British Tariff Commission's Report	24
The Financial Improvement	24
A Change in British Patent Laws	25
The Jones & Laughlin Steel Company	25
The Frick Coke Company Will Build 1000 New Coke Ovens	25
The Union Rail Company	25
Canadian Trade Affairs	26
Notes from Great Britain	27
Personal	28
Labor Notes	28
Obituary	29
Lake Mining Matters	30
Pig Iron Production for the Half Year	31
The United States Steel Corporation's Quarterly Statement	31
Power Plant of the Chicago Drainage Canal	31
Manufacturing:	
Iron and Steel	31
General Machinery	32
Power Plant Equipment	32
Foundries	32
Bridges and Buildings	32
Fires	33
Hardware	33
Miscellaneous	33
The Iron and Metal Trades:	
A Comparison of Prices	34
Chicago	34
Philadelphia	36
Cincinnati	37
Cleveland	37
Pittsburgh	38
Birmingham	39
The Belgian Iron Market	39
The New York Machinery Market	41
New York	42
Metal Market	42
Hardware:	
Condition of Trade	43
Notes on Prices	44
Michigan Retail Hardware Dealers' Association	45
An Impostor in Pennsylvania	45
Requests for Catalogues, &c	45
Trade Items	45
The Catalogue House Question	46
Letters from Merchants	47
The Ferrokraft Company	48
Samuel Winslow Skate Mfg. Company	48
Factory Cost and Business Methods	49
Death of Thomas W. Munroe. Portrait	50
Trade Winning Methods. Illustrated	51
Going After Trade in Missouri. Illustrated	52
The Ideal Handbook No. 16	52
Joseph Rodgers & Sons' New Catalogue	52
Cleveland Twist Drill Company's Catalogue	52
Chicago Hardware Dealers' Picnic	52
British Letter	53
Trade Conditions in Australia	54
Cement Coated Wire Nails	54
Baker & Hamilton's Catalogue	55
Price-Lists, Circulars, &c	55
Miscellaneous Notes:	
Victor Coal Hods	56
Dixon's Anglo-Saxon Pencils	56
Improved Mop Wringers	56
Richards' Parallel Track Door Hangers. Illustrated	56
Hotel Call Bell No. 385. Illustrated	56
Cast Iron Roller Skate Rollers. Illustrated	56
The Universal Trousers Stretcher and Hanger. Illus	56
The Sensible Screw Driver. Illustrated	57
The Oak Damper. Illustrated	57
Little Champion Burglar Alarm. Illustrated	57
Current Hardware Prices	58

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

A BROOM WINDOW.

BROOMS were the subject of a very attractive window display made by the Palace Hardware House branch of United Hardware & Supply Company, Erie, Pa. The Brooms were all the product of an Erie manufacturer. The window display, which was pronounced by visiting traveling men one of the finest Broom exhibits they had ever seen, was a business bringer, in that the company's trade on Mill, House and Whisk Brooms was increased more than three times its former volume. Many persons entered the store with the remark, "Why, I did not know you handled Brooms, or would have bought of you before," indicating that despite the company's announcement from time to time in the local papers that they carried all kinds of Brooms, there were lots of people who were not impressed with the fact, or, indeed, aware of it, until the show window was made the medium through which to bring it emphatically and permanently home to them.

A Broom Window.

WINDOW DISPLAYS, ADVERTISING AND AN ATTRACTIVE STORE.

THE PEASE-HUMPHREYS HARDWARE COMPANY, West Superior, Wis., advise us that perhaps their most successful method of attracting attention and trade has been their window displays. Their store has a 50-foot front, with two fine windows, in which the company are constantly making new and attractive displays. They aim to make their windows one of the notable features of the city, and have pretty well succeeded. They also, of course, use the daily papers quite freely, and make their store interior as attractive as possible, a special feature being an extensive sampling of goods, which is of great assistance to purchasers in buying needed goods, while also reminding them of others for which they may have use. The company keep hammering away on the above plan constantly, and by adding new lines of goods from time to time, have been able, steadily, to increase their sales and profits.

ENCOURAGING CASH TRADE.

WITH a view to building up cash trade the Geo. A. Weaver Company, Newport, R. I., uses checks, one of which is represented herewith. The checks used are five in number—namely, ½ cent, 1 cent, 2½ cents, 5 cents and 10 cents. These have a 5 per cent. value and are redeemable when accumulated to the amount of $1, or when the customer has traded with the Weaver Company to the extent of at least $20 worth of cash business. They are given on every sale of 10 cents or its multiple. While the intention is to give 5 cents on the dollar, the firm advises us that the scheme does not cost anything like that. For instance, say, a customer buys 55 cents worth of goods to-day and 55 cents worth more to-morrow, or buys 45 cents worth in one department and 65 cents worth in another. While his purchases amount to $1.10, the manner in which they are made entitles him only to a 5-cent rebate in the form of checks, or as if he had bought only a dollar's worth of merchandise. In this way the firm has found that on the average it delivers but $1 worth of checks on goods that cost the purchaser nearly $22. It is figured that it costs the firm from 70 to 75 cents in actual cost of goods to redeem each dollar's worth of checks returned. On this basis during 1902 the redemptions cost the firm 1 97-100 per cent. on its total cash trade, and during 1903, 1 60-100 per cent. Each check is indorsed, "The Geo. A. Weaver Company," with a rubber stamp.

Cash Check.

GOING AFTER TRADE IN MISSOURI

The accompanying cut represents, in reduced form, one page of an eight-page circular issued by the Pickens, Diss & Smith Hardware Company, Maryville, Mo. This was the company's first attempt in this direction, and results showed it to be a trade winner. The illustrations in

the circular are almost all *Iron Age* Advertising Cuts, the smaller cuts being used, as the saving of space was an important factor in arranging the circular. The cuts were afterward used in newspaper advertising.

An Ingenious Idea.

Subsequently the company had shipping tags printed, as shown herewith:

One of these was hung on the door knob of every house in their town. These tags proved an effective trade winner.

Three Points in Advertising.

The company are liberal newspaper advertisers, and make three points prominent: Illustrations, prices and firm name. They do not advertise more than one or two things at a time, but try to have the advertisement say "something" each time.

THE IDEAL HAND BOOK No. 16

IDEAL MANUFACTURING COMPANY, New Haven, Conn., has issued Hand Book No. 16, containing valuable information for dealers in Arms and Ammunition, and for all who use Rifles, Pistols or Shot Guns; also for military companies, gun clubs or individuals. A number of pages are devoted to such subjects as reloading shells for high power rifles, seating bullets, preparing antimony alloys, smokeless powder charges, &c. New tables for high power smokeless powder charges, and low power smokeless, semismokeless and black powder charges are also given. New goods and new attachments for various adjustable reloading tools are also shown. An index to illustrations of Bullets enables one to ascertain the standard diameter of Bullets for various arms, and also the page where the illustration, description, price of Mold, &c., may be found. The book will be sent to anyone upon receipt of three stamps to cover postage.

JOSEPH RODGERS & SONS' CATALOGUE.

ALFRED FIELD & CO., 93 Chambers street, New York, as sole agents in the United States for the numerous kinds of cutlery made by Joseph Rodgers & Sons, Sheffield, Eng., have just issued a profusely illustrated catalogue of this line, showing Pocket Knives in great variety, Razors, Table Knives and Forks, Carvers, Hunting and Bowie, Potato and Oyster Knives, Sticking, Boning, Skinning, Cotton, Shoe, Farrier, Bread and Lemon Knives, Scissors, Manicure Implements, Knife Sharpeners, Steels, Manicure Knives, Can Openers, Champagne Nippers, Erasers and similar goods. This book has been issued for wide distribution, especially to retail dealers, to enable them to easily and accurately designate by number and trade name any of the goods catalogued when ordering of their jobber.

CLEVELAND TWIST DRILL COMPANY'S CATALOGUE.

CLEVELAND TWIST DRILL COMPANY, Cleveland, Ohio, has issued a catalogue covering its products, comprising Twist Drills, Reamers, Taps, Mills, Cutters, &c., which cancels all previous editions. The company also manufactures special Tools to order. Attention is called to Turret Lathe and Screw Machine Tools, which are designed to supply a growing demand for Tools in sets of uniform diameter of shanks and uniform lengths, for such Tools as would be required in the turret head to complete a given piece of work at one setting.

CHICAGO HARDWARE DEALERS' PICNIC.

A TOTAL of 115 prizes will be awarded at the Chicago Retail Hardware Association's tenth annual picnic, to be held at Northwestern Park, August 10. Among the events for which prizes are offered, are: Target shooting, members only, four prizes; target shooting, open contest, eight prizes; guessing contest, four prizes; bowling match, four prizes; tug of war, fourteen prizes; baseball, members only, ten prizes; baseball, open game, ten prizes; 20 yards' dash, for boys and girls, three prizes; 50 yards' dash, for boys, four prizes; sack race for boys, four prizes; 50 yards' dash, four prizes; potato race, five prizs; salesmen's race, five prizes; 50 yards' dash, seven prizes; egg race, seven prizes; 50 yards' dash, young women, five prizes.

The Way Hardware Company, Hartford, Conn., has sold its stock of goods to T. Jacobs & Co., New York. The stock will be removed to New York, the Hartford store having been leased to another concern.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., July 16, 1904.

The Week's Hardware Trade.

THIS week there has been a more hopeful tone throughout the market, but, as they say in Yorkshire, "nothin' to brag on." We have experienced during the last fortnight an unusually hot period, with hardly any rain, and this imperils the prospects of a successful harvest. It is an ill summer that does not do somebody some good, and accordingly, whilst the farmers are unhappy with the dry spell, makers of Galvanized Tanks, Water Barrows and water vessels of every kind, Garden Seats, Refrigerators, Meat Safes, &c., are all busy. In such goods as these the retail trade has made considerable progress in turning over old stocks, and of course the effect is felt by the manufacturers. The seaside trade is improving, as one would naturally expect, but otherwise things are not brisk.

In Sheffield there is reason to believe that some of the lighter trades are in a healthier position this week. There is a fair demand for Saws, Files and Steel, whereas the trade in builders' goods gets worse every week. Firms in the Silver, Electro Plate and Cutlery branches report an increased turn over. There is a considerable output of Celluloid Cutlery, but the demand for Ivory Cutlery has sunk to minute proportions.

On overseas account there is distinct improvement in Australian orders coming to hand, and exports to Canada have improved. One of the most remarkable features of the foreign trade at the present moment is the growing prosperity of some of the South American States. Argentina, Brazil and Chile—especially the former—are all buying more freely of Hardware and Cutlery, and the numerous requirements of house and farm. Hardware manufacturers generally have been doing better in the export trade. With the exception of Germany and Belgium, which are increasingly supplying their own requirements, the Continental demand for Hardware shows improvement. The West Indian trade also improves, but the South African market is, if anything, more stagnant than before. Tool makers and Anchor Chain and Cable makers have also been selling abroad more lately, but there has been less activity in the export of Tubes and Fittings. This is largely accounted for by the falling off in South African, West Indian and Australian requirements. The same remark applies in less degree to Iron and Steel Pipes. Metallic Bedsteads are not selling on overseas account so well as a few weeks ago. Indian trade is not quite so good, and, indeed, the Far East just now shows gloomy prospects.

A Bombshell in Sheffield.

A bombshell has been thrown into Sheffield by the Indian Government, who have determined to provide the troops in India with all Steel Knives and Forks made by machinery. The innovation is far from welcome, either to manufacturers or to the men. It is calculated that if the change is carried right through the Government departments, it will mean loss of employment to many Cutlers and Steel Fork makers, as the demand from the general public for the class of goods which they have been making is now trifling in extent, and they have depended for their living mainly upon the Government. The change has been brought about by the introduction into Sheffield of American machinery. For many years our soldiers have used Table Knives of the scale tang or flat tang variety, with black buffalo scales, while the old fashioned three-prong Steel Fork, which is almost obsolete as regards the general public, is the conventional army pattern. Now that a change has been determined upon, it proves to be of a revolutionary character, representing a leap from an antiquated style scarcely known to the younger generation to one only in its infancy. The India Office are inviting tenders for 71,000 Table Knives, 77,000 Table Forks and 18,600 Tablespoons for the use of the troops in India. The spoon is to be of the same kind as heretofore, but the patterns of Knife and Fork submitted to the trade have been made by Boswell, Hatfield & Co., Limited, of Sheffield, by American machinery, which dispenses entirely with human cutlers, grinders or finishers. Practically, a bar of steel is placed in the machinery, and leaves it a finished Knife or Fork, the machinery fashioning handle, bolster and blade, and grinding and finishing the blade. Thus, the articles will consist of a single piece of steel, without joint or weld. During the Chitral campaign our soldiers had to make shift with Table Knives without handles, as the climate caused the ends of the horn scales to curl up and forced out the rivets. It became necessary, to make the Knife usable, to remove the handle altogether. The inconvenience thus caused seems to have been one of the reasons which induced the authorities to seek a Knife which would withstand certain climatic conditions more effectually.

Opportunities in Ceylon.

Ceylon, our principal Crown Colony, offers a large and steadily growing market, which should receive careful consideration by American manufacturers and exporters. It appears that the German exporters are gaining a firm foothold there, and for every English traveling salesman there are, at least, ten Germans in the field. A German trade journal has lately reviewed the market offering in the Colony for German wares, and here are some "tips:"

Ceylon offers a good market for Cement, large quantities being imported from Belgium and Germany.

Corrugated Iron is imported in about equal quantities from Great Britain and Germany.

There is said to be a good demand for Nails, Bolts, Screws and Rivets, both plain and galvanized.

The demand for Barbed Wire has increased enormously, as has also the demand for Wire Netting.

Spades, Hoes, Axes and Hatchets, Rakes and similar agricultural instruments are in good demand, but only the inferior qualities.

A good market might be established for oil milling machinery, as the cocoanut planters are beginning to comprehend that it is more profitable to export the oil than the copra.

The erection of saw mills is increasing constantly, and machinery for such mills is in demand.

Galvanized Iron Pails are also in demand.

German manufacturers are capturing the market for Enameled Ware.

Stoneware finds ready sale, especially in cheap grades.

There is also a demand for hanging and wall Lamps for petroleum.

Cheap toilet soap, in fancy carboard boxes, is also sold readily.

A brisk business has been done by the native dealers in a cheap grade of German crackers, due in a great measure to the packages in which the crackers are sold, namely, decorated tin boxes with hinged lids, which afterward are used for all sorts of purposes.

How to Do Business in Denmark.

According to the ordinary law in Denmark, foreigners are only allowed to carry on business in their own name after a residence of five years, but subjects of States in which there is no such restriction are excepted, and therefore American subjects are at liberty to start in business at once when they take up their residence in Denmark. If it is desired to register a trade-mark in Denmark the following documents are necessary and must be sent:

1. Three copies of the trade-mark, not exceeding 6 inches in length and 4 inches in breadth.

2. Two copies of the printing block (electro) of the same dimensions as the foregoing.

3. An official extract of the Register of Trade-Marks in the United Kingdom, as proof that the trade-mark has already been registered there.

4. A power of attorney, which enables any agent to give notice of the trade-marks and to receive on behalf of the applicant possible citations from the Danish court.

5. A declaration of the applicant to the effect that in all questions respecting a trade-mark he will submit to the decision of the Mercantile and Marine Court at Copenhagen.

Any one registering a trade-mark in the United Kingdom has the preferential right to register the same mark in Denmark, but this right is limited to a period of four

months following the date of the registration in the United Kingdom. If the owner of the trade-mark in the United Kingdom fails to exercise his right within that period, any one in Denmark can appropriate it, register it in his own name, and thereafter debar the original owner himself from using it in Denmark. It is true that there is a provision that any party proving a prior use of a given mark can object to its appropriation in Denmark by a stranger, but he must commence an action within four months after the publication of the registration of the mark has been made in the Danish Daily Official Gazette. This, however, is very unlikely ever to come to the notice of any one in the United Kingdom. If once the period of four months has passed, the usurper acquires an absolute right to the mark, and can shut out or even cause, if he so wishes, the confiscation of the goods of the original owner.

TRADE CONDITIONS IN AUSTRALIA.

SYDNEY, June 6, 1904.

IN making a business trip through Australia in the interests of several Hardware manufacturers in the United States, I have been impressed with certain facts that I believe will prove of interest to those at home engaged in trade here.

Australia and United States About Equal in Area.

Australia is a continent in itself. Its area is close to that of the United States, not including Alaska. It is a commonwealth, consisting of the following States, viz.: Queensland, New South Wales, Victoria, South Australia, West Australia and Tasmania. The Federal Government has its temporary seat at Melbourne. The State governments are located in the principal cities of each State. In spite of its vast area the total population is estimated at about 5,000,000. The year book of 1904 gives the following estimated population as of December 31, 1902:

	Population.	Area in square miles.
New South Wales	1,405,450	310,700
Queensland	514,851	668,497
South Australia	365,791	903,690
Victoria	1,205,513	87,884
West Australia	215,157	975,920
Tasmania	177,072	26,215
Totals	3,883,834	2,972,906

Australia's Chief Cities.

The principal cities in Australia are Brisbane, Sydney, Melbourne, Adelaide, Fremantle and Perth, and in Tasmania, Launceston and Hobart. The aggregate population of these eight cities is approximately 1,250,000, indicating that about one-third of the total population lives in these towns. Furthermore, these cities are all either directly on the coast or accessible to it by water. The importing is therefore naturally confined to the coastal towns, and the merchants located therein are the natural distributors.

Agricultural and Mining Sections.

Back of the cities lie the farming, stock, grazing or mining sections. Inland are the desert lands, oftentimes rich in soil but devoid of water. Australia is just recovering from the effects of a seven years' drought. There are said to be children, six or seven years of age, born in the interior, who have never seen rain. The finances of the country have been through a severe strain and have by no means recovered.

Bank Loans to Ranchmen.

The banks loaned large amounts to the "squatters," or ranchmen, as they are termed here, and to other classes as well. This money is beginning to come back, but from the best information I can obtain it will be two years before the loans are repaid. In the meantime the process of recuperation is at work—exports of wheat are increasing rapidly, herds and flocks are multiplying and improvement is in sight. On the other hand, the individual States which have been heavy borrowers have had to retrench. The tendency toward a somewhat extravagant and ambitious expenditure of money is checked. The borrowing capacity of the nation, which is already heavily in debt, has been reached and economy is the order of the day.

Commanding Position of Labor Element.

The labor element is also a vital factor in the development of the country. About ten years ago the labor leaders decided to obtain power through office. They have followed this policy with success and to-day control the Government, the present Premier being John Christian Watson, a labor leader. The labor policy has succeeded in putting in force a number of restrictive laws governing the rate and hours of labor, the arbitration of trade disputes, &c., with the result that capital is alarmed and new enterprises in the line of manufacturing are at a standstill. This has an unfortunate effect on all merchants in machinery or supply lines, and trade in this direction is at a low ebb.

Concentration of Trade in Large Cities.

The concentration of trade in the large cities, and the limited population are the two points that our manufacturers want to bear in mind. The centralizing of the importers makes competition extremely keen, especially during the present dull times, when trading is essentially overdone. On the other hand the population is so limited that there is a comparatively narrow field for the merchants here to work in.

Skilled Representation for Manufacturers.

I regard it as highly important for a manufacturer to have some intelligent and capable representative on the ground to look after and protect his interests. I know of four or five instances where makers had a good trade here to begin with, but have completely spoiled it by a want of knowledge of the local conditions. They have made it impossible for any of the large merchants to sell their goods at a profit and have frequently alienated the good-will of the wholesale merchant by quoting the retailer either directly or indirectly the same prices.

Australians Friendly to America.

The attitude of Australians toward the United States is distinctly friendly and, if anything, they are possibly more disposed to do business with the United States than with Great Britain. Our Tools are fully appreciated and in the last ten years have made great headway. It is natural that Australia and the United States should be in close and friendly touch. In opening up a new country they have been through the same experiences we had to meet only a few years before them, and while they are struggling to-day with some of the inevitable problems that confront a new country, I believe the good, strong sense and character of the majority will carry them through to a happy conclusion, aided by the possession of a country undeniably rich in natural resources.

HENRY T. SEYMOUR.

CEMENT COATED WIRE NAILS.

ONE of the Patents on Cement Coated Wire Nails expired this year, and other manufacturers of Nails are now making them. The Nails are sold by the keg, not by the pound, at the same advances as Smooth Wire Nails, and weigh about 70 pounds to the keg. The original maker claimed that there were the same number of Coated Nails in a keg as of Smooth Wire Nails, and the present makers claim the same, as to the correctness of which claim no question is raised. Coated Nails have always been one to two gauges smaller, also shorter, than the regular Smooth Wire Nails, which explains the lighter weight per keg. The process of coating is supposed to cost less than 5 cents per keg. Coated Nails are used mainly for making boxes, crates, cases, kegs and barrels, because of their greater holding power. New York jobbers sell them in small lots from store at $2 to $2.10, base.

JOHN H. BARLOW of the Ideal Mfg. Company, New Haven, Conn., has been elected an honorary member of Company D, Second Regiment C. N. G. Mr. Barlow has the distinction of being the first person who has thus been elected during the 75 years or more that the command has been in existence. This action on the part of the Connecticut Militia was tendered as a token of appreciation for the valued assistance Mr. Barlow freely gave in aiding the company to prepare their own ammunition.

BAKER & HAMILTON'S CATALOGUE.

BAKER & HAMILTON, San Francisco, Cal., have issued a new loose leaf catalogue which they refer to as being the first catalogue of the loose leaf variety published on the Pacific Coast. The book contains about 1300 pages, comprising such goods as the firm carries in stock, including Hardware, Iron, Steel, Pipe, Mining and Mill Supplies, Engine Trimmings, Farming and Lumbering Tools, Creamery Supplies, Cutlery, Sporting Goods, Bicycles and Sundries. The catalogue will be kept up by the weekly addition of new and corrected pages. All kindred goods are grouped together, reference to which is provided by an index of departments, as follows:

Mechanics' and Edge Tools.
Farming Tools and Implements, Lumbering Tools and Contractors' Supplies.
Builders' and Shelf Hardware.
Nails, Wire, Miscellaneous Hardware and House Furnishing Goods.
Bar Iron and Steel, Bolts and Nuts, Mine Supplies, Fittings and Engine Trimmings.
Cutlery.
Sporting Goods.

The department index is followed by an alphabetically arranged index of 27 pages. On account of the firm's increasing foreign business it has been deemed advisable to codify all goods possible. Sixteen pages are devoted to the code tabulations. In connection with illustrations, descriptions and prices of goods, throughout the catalogue, weights are given, which are approximately correct, or sufficiently so for all practical purposes. The press work and paper are excellent, the arrangement of illustrations, descriptions and prices is convenient, and the firm is justified in taking pardonable pride in the handsome appearance of the work. Baker & Hamilton also issue special catalogues of Agricultural Implements, Vehicles, Bicycles and Bicycle Sundries and Creamery Supplies.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their line, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

YALE & TOWNE MFG. COMPANY, 9-13 Murray street, New York: Lock Equipment for factories, including doors, lockers or drawers so arranged that some locks can be opened by a selected number of persons, and all opened by a master key.

WESTCOTT CHUCK COMPANY, Oneida, N. Y.: Illustrated catalogue of four styles of Drill Chucks and nine styles of Lathe Chucks.

THE TAPLIN MFG. COMPANY, New Britain, Conn.: Circulars illustrating the Victor Bottle Stopper and Opener, also the Victor Folding Coat and Garment Hanger.

REINEKE, WILSON COMPANY, Pittsburgh, Pa.: "Trade Topics," a pamphlet published by them from time to time.

LOGAN & STROBRIDGE IRON COMPANY, New Brighton, Pa.—Branch of the National Novelty Corporation, 826,-828 Broadway, New York: Catalogue No. 1-1 relating to Housefurnishing and Builders' Hardware, Iron Toys, Etc.

WYETH HARDWARE & MFG. COMPANY, Saint Joseph, Mo.: Catalogue of Stoves and Ranges for the season of 1904-05.

THE AMERICAN COLLAR-HAME COMPANY, Speedwell, Va.: The Get Up Plow Gear, also Lawson's Patent Collar-Hame, a collar and hame combined.

OHIO TOOL COMPANY, Columbus, Ohio, and Auburn, N. Y., J. C. McCarty & Co., 10 Warren street, sales agents: Catalogue No. 21, devoted to Planes, Plane Irons, Chisels, Drawing Knives, Gouges, Auger Bits, Handles, Bench and Hand Screws, Coopers' Wood and Edge Tools. The catalogue presents a number of new Planes not listed in the last issue.

ANDERSON MFG. COMPANY, Anderson, Ind.: The Onlie Dust Pan, constructed so that the front edge of the Pan is pressed firmly to the floor when the rear extension is held by the foot.

KNOX FENCE COMPANY, Lebanon, N. J.: Circular illustrating the Perfection Spring Lock Wire Farm and Lawn Fences and Double Gates.

HOLTON & WEATHERWAX COMPANY, LIMITED, Jackson, Mich.: Eames Combination Pulleys—iron hub and iron bushings, maple arms and poplar rims.

THE METAL MFG. COMPANY, New Haven, Conn., New York salesroom 10 Warren street: Brass and Brass Plated Picture Hooks, Extension and Spring Pole Brackets, Extension Vestibule and Curtain Rods, Bird Cage Springs.

JUSTUS ROE & SONS, Patchogue, N. Y.: Illustrated catalogue of Roe's Patent Roller Awning Fixtures, with description of parts, the castings of which are made of malleable iron.

LOVELL MFG. COMPANY, Erie, Pa.: Wholesale price-list of Anchor brand of Clothes Wringers, under date of July 5, 1904.

THE WIRE GOODS COMPANY, Worcester, Mass.: Supplementary pages illustrating a considerable number of the company's Wire products.

GEORGE PARTRIDGE & SON, England, Rees Worrall, Youngstown, Ohio, sole agent for the United States: Folder illustrating Single Slide and Lamont's Double Slide Gauges.

MACOMBER & WHYTE ROPE COMPANY, Chicago, Ill.: Illustrated catalogue devoted to Wire Rope for every purpose, Guy Anchors, Rope Clips, Wire Switch Ropes, Rope Fastenings, Turnbuckles, Sheaves, Blocks, &c.

ISAAC CHURCH, Toledo, Ohio: Illustrated price-list of Church's Patent Perfect Expansion Bolts. These are shown single and double, adapted to a wide range of uses.

AMERICAN STOVE BOARD COMPANY, Chicago, Ill.: Catalogue of 1904 prices, illustrating Florentine Enameled, Crystallized and Aluminum Stove Boards.

THE GREY IRON CASTING COMPANY, Mount Joy, Pa.: Two catalogues, one showing its full line of Hardware, Novelties and Toys, and the other its Toy line only.

INDIANAPOLIS DROP FORGING COMPANY, Indianapolis, Ind.: Price-list illustrating Tiger, Tiger Pipe, Always Ready and Track Wrenches, Hand Hole Plates, Combination Pliers and Ammonia Flanges.

GEE WHIZZ WASHING MACHINE COMPANY, successor to Randelman & Sons, Des Moines, Iowa: Circulars illustrating and describing the Gee Whizz and Beats All Washing Machines.

BUTLER BROTHERS, 491-497 Broadway, New York: An illustrated catalogue of 28 pages, with special prices, at which the goods shown will be sold to merchants during August only.

THE UNITED STATES STEEL LOCK COMPANY, Lyons, Iowa: Catalogue No. 5, bound in heavy board covers. This catalogue contains 216 pages, most of which are devoted to illustrations of Knobs, Locks, Keys, Escutcheons, Handles, Pull Plates and other Builders' Hardware, accompanied by tables of sizes and finishes. The line includes not only the inexpensive grades for flats and small residences, but a very long line of art goods.

THE PIKE MFG. COMPANY, Pike, N. H.: Booklet entitled "Oil Stones—How to Select and Use Them." The booklet contains some alterations in and additions to the matter which has appeared in former issues, and will be of interest to mechanics and users of Edge Tools generally. The company will be glad to send a copy of the booklet on application.

W. T. Green has purchased the interest of his partner in the firm of Green & Caldwell, Chattanooga, Tenn., and will continue under his own name the wholesale and retail business in Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Paints, Sporting Goods, &c. Mr. Green is making important improvements in the establishment with a view to bringing it down to date in its appointments.

MISCELLANEOUS NOTES.

Victor Coal Hods.

The Victor Stamping Company, Loveland, Ohio, is now manufacturing the Victor oval bottom coal hod, the construction and material of which are alluded to as of the best. The bottom is put on by patent double lock seam to hold it firmly. The bail is oval, so as not to hurt the hand. The foot, as well as the body, is genuine wired. The oval bottom is referred to as giving the hod a neat appearance, and together with the square nose and heavy ears, it is remarked, go to make a first-class hod.

Dixon's Anglo-Saxon Pencils

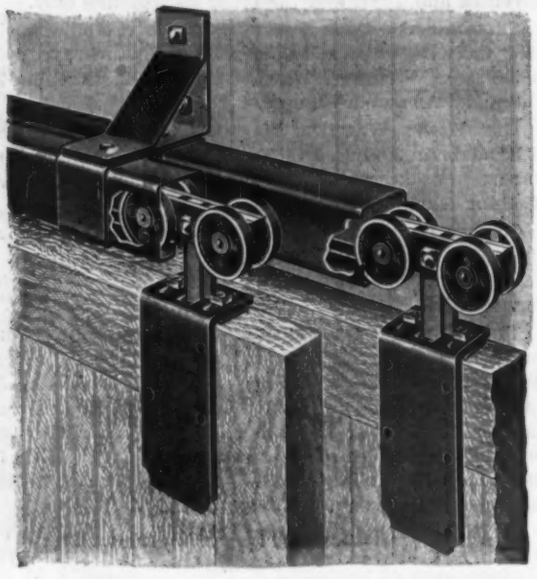
The Joseph Dixon Crucible Company, Jersey City, N. J., and 68 Reade street, New York, has just put on the market an attractive line of black lead pencils, to be known as Dixon's Anglo-Saxon. The shape is hexagonal; they are made in four degrees of hardness, Nos. 1, 2, 3 and 4; have round red rubbers in bronze metal tips, and the cedar is finished in two colors, a rich purple and olive green. They are put up a dozen in a box, six boxes in a carton, the smaller boxes being especially pleasing in appearance, one style having a dark purple covering and the other a dark green, with partially telescoping ends, so as to show a portion of pencils when end is removed.

Improved Mop Wringers.

Eagle Cooperage Works, Circleville, Ohio, have improved their mop wringers by attaching the treadle pivots with bolts instead of screws, as formerly. The wringer is atttached to a substantial white cedar pail bound with electric welded hoops. The manufacturers allude to the wringer as having all parts made of the best material to secure strength and rigidity.

Richards' Parallel Track Door Hangers.

The Richards Mfg. Company, Aurora, Ill., has perfected a system of hangers for parallel doors running on parallel tracks, both tracks being suspended from the same bracket, as shown herewith. Doors of this character are intended primarily for manufacturing establish-



Richards' Parallel Track Door Hangers.

ments, round houses and the like, and frequently buildings are put up nowadays with a continuous wall of these sliding doors, making it possible to make large openings at any part of the building by simply shoving the doors back on the trolley track. The brackets are also supplied of a form permitting them to be hung from the ceiling, instead of being bolted into the wall. Wooden runways or tracks may be inserted in the hollow steel rail, making the doors practically noiseless. The method of attaching the hangers to the doors permits of liberal lateral adjustment.

Hotel Call Bell No. 385.

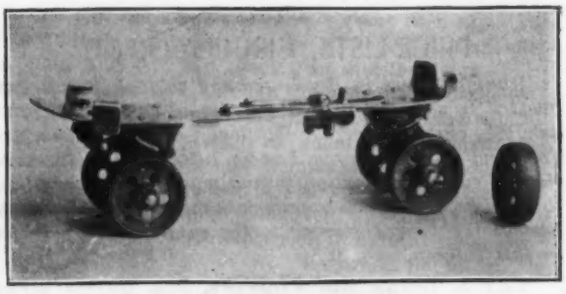
The Gong Bell Mfg. Company, East Hampton, Conn., makes a specialty of hotel and school call bells. The hotel call bell, herewith illustrated, is 5 inches in diameter, made of pure copper and tin bell metal, thus to give it

Hotel Call Bell No. 385.

an excellent tone. The base is cast brass and the whole nicely nickel plated, making an attractive and useful bell for hotels and other places. The school call bell is slightly smaller, but of the same high quality, and is adapted for use in Sunday schools. These two bells are referred to as unique inasmuch as they are in a field by themselves and are manufactured especially to meet the approval of the class of trade desiring the best.

Cast Iron Roller Skate Rollers.

The accompanying cut illustrates the cast iron rollers for roller skates put on the market by the T. B. Harkins Foundry Company, Bristol, Pa. The rollers are a little heavier than wood rollers, but are referred to as more

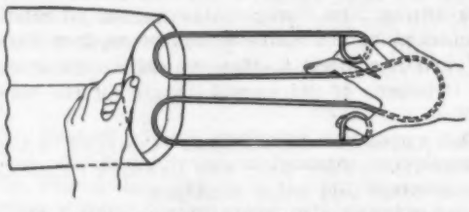


Cast Iron Roller Skate Rollers.

durable, easier running, as presenting less surface for resistance and as wearing truer. The demand for something more substantial than wooden rollers, owing to the increased use of roller skates on asphalt pavements in the larger cities, has been the cause for the introduction of the iron rollers.

The Universal Trousers Stretcher and Hanger.

The Universal trousers hanger and stretcher, made by Anders Holmer, 283 La Salle avenue, Chicago, consists of a flat wire spring, in two divisions, corresponding roughly to the form of a pair of shears, shown herewith.

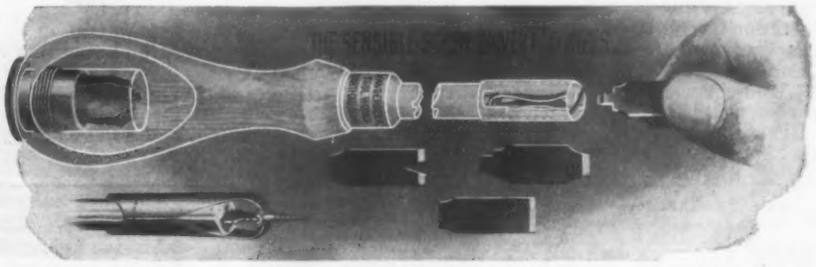


The Universal Trousers Stretcher and Hanger.

The spring is inserted at the bottom of the trousers leg by compressing the spring, a stretcher being used for each leg. The stretcher once inserted acts as a hanger and the weight of the garment tends to smooth out wrinkles in the upper part of the leg and to take out the bag at the knee.

The Sensible Screw Driver.

The Vanderbeek Tool Works, Hartford, Conn., are putting on the market an inserted blade screw driver, which is shown in the accompanying illustration. It is fitted with and without an attachment for automatically holding any size screw to the end of the screw driver blade as a substitute for a third hand, often wanted in construction and other work. The shank of the tool is of ordinary steel, slotted the thickness of the blade used, to a shoulder. It is also drilled from the end sufficiently deep to hold a formed V-spring. A closed end steel ferrule with a slot the thickness of the blade cut in its end is tightly drawn over the slotted end of the shank with the spring in position. The blades are made double ended for different sized screws and conditions, are easily and quickly inserted or withdrawn by the hand, and are frictionally held in position by the V-spring. The lower end of the handle is bored as a reservoir for a number of blades and this is closed by the insertion of another steel ferrule headed to a wide flange and held by a spiral friction coil, which end may be used as a hammer head, having exceptional strength. The screw driver is made in various sizes, from the pocket size to a shank 10 inches long.



The Sensible Screw Driver.

The Oak Damper.

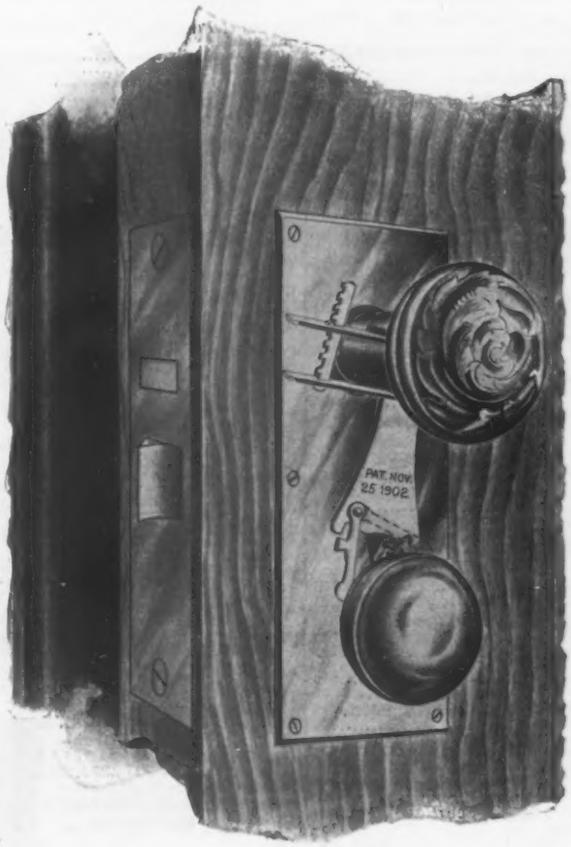
George H. Cole & Son, Troy, N. Y., are manufacturing the Oak damper, shown in the accompanying illustration. The damper, it is pointed out, is particularly adapted for use with oak stoves, as the air tight draft dampers commonly used in Oak stoves check the fire too much when closed, and have the opposite effect when open. The Oak damper, the construction of which is readily seen in the cut, being double, or, in fact, two dampers in one, and having openings on either side of sufficient capacity for the gas to pass off, can be used in a horizontal position, except when starting a fresh fire, thus insuring a steady combustion. The manufacturers claim that it baffles and retards the combustion without danger of gas escaping from the stove, allowing the smoke and gases to become heated sufficiently to ignite, thereby saving a large amount of heat, which otherwise would pass through the smoke pipe and be wasted. It is claimed to be a positive safeguard against down draft and makes a direct draft stove equal to a base burner. The damper can be inserted in the pipe in the same way as the single plate dampers now in general use. It is made in four sizes, 5, 6, 7 and 8 inches in diameter, respectively. While primarily intended for oak stoves, the makers claim that it is equally good for any heating or cooking apparatus where wood or coal is used.

The Oak Damper.

THE R. D. CONE COMPANY, Winona, Minn., has closed out and will discontinue the Heavy Hardware department of its business. The company will hereafter confine its efforts entirely to the Shelf and Miscellaneous Hardware trade.

Little Champion Burglar Alarm.

The Universal Novelty Company, 1358 Broadway, New York, is introducing a number of useful novelties, one of which, the Little Champion burglar alarm and announcer, is here shown. It consists of a simple piece of mechanism which can be instantly suspended from the shank of knob on inner side of any door, whether that of a bedroom, front or back entrance doors, &c., so that any tampering with outer knob starts a continuous ringing that not only warns the occupants, but in a majority of instances frightens intruders away. As seen in the cut, the device can be instantly attached to the shank of any knob by means of a hinged clamp curved in center to better grip the shank, the movable notched rack making it adjustable to any size of shank and holding securely to knob. As the outer knob is turned the sheet metal cam plate is turned so that one of two of the slightly convex bearing points forces down a push knob, which, releasing, as long as the pressure continues, a simple clock work mechanism, causes a continuous ringing until the device is exactly perpendicular again. The bell metal gong is 2¼ inches in diameter and the electric bell effect is produced by revolving the gong itself a few turns—that is, winding it up. If a continuous alarm for some minutes is desired, as, for instance, when affixed to an entrance door some distance away, this can be accomplished by throwing over a pivoted arm that insures an alarm until the clock work runs down. The device is about 5½ inches long and substantially made, the finish being in nickel plate.



Little Champion Burglar Alarm and Announcer.

Current Hardware Prices.

REVISED JULY 26, 1904

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

Adamite in Carloads:
Crystal ₱ ton $90@100
Grain ₱ ton $120@140
See also *Emery.*

Adjusters, Blind—

Domestic, ₱ doz. $3.00 33⅓%
North's 10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—

Ives' Patent 35%
Tapliu's Perfection 35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Eagle Anvils ₱ ₺ 7¼@7¾¢
Hay-Budden, Wrought 9@9¼¢
Horseshoe brand, Wrought 9@9¼¢
Trenton ₱ ₺ 9@9¼¢

Imported—

Peter Wright & Sons ₱ ₺ 10½¢

Anvil, Vise and Drill—

Millers Falls Co., $18.00 15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Hull Bros. Co 30&5%
Livingston Nail Co 33⅓%

Augers and Bits—

Com. Double Spur 75@75&5%
Boring Machine Augers 66⅔@70%
Car Bits, 12-in. twist 60@60&10%
Jennings' Pattern 50&10&5@60%
Ford's Auger and Car Bits 40&5%
Forstner Pat. Auger Bits 25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list 25&10%
No. 30. R. Jennings' List. 40&7½&10%
Russell Jennings' 25&10&2½%
L'Hommedieu Car Bits 15&10%
Mayhew's Countersink Bits 45%
Millers' Falls 50&10&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits 40&10%
Pugh's Black 20%
Pugh's Jennings' Pattern 35%
Snell's Auger Bits 60%
Snell's Bell Hangers' Bits 60%
Snell's Car Bits, 12-in. twist 60%
Wright's Jennings Bits (R. Jennings' list) 50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's small, $18; large, $26 50&10%
Clark's Pattern, No. 1, ₱ dos., $26; No. 2, $18 50&10%
Ford's, Clark's Pattern 50&10&6%
C. E. Jennings & Co., Steer's Pat. 25&10%
Swan's 60%

Gimlet Bits—

Common Double Cut. gro. $3.00@3.25
German Pattern gro. $4.50@4.75

Hollow Augers—

Bonney Pattern, per doz. $10.00@11.00
Ames 25&10%
New Patent 25&10%
Universal 20%
Wood's Universal 25%

Ship Augers and Bits—

Ford's 40%
C. E. Jennings & Co.:
L'Hommedieu's 15&10%
Watrous' 33⅓&10%
Ohio Tool Co.'s 40%
Snell's 40%

Awl Hafts, See *Hafts, Awl.*

Awls—

Brad Awls:
Handled gro. $2.75@3.00
Unhandled, Shouldered. gro. 63@66c
Unhandled, Patent gro. 66@70s
Peg Awls:
Unhandled, Patent gro. 31@31c
Unhandled, Shouldered. gro. 65@70c
Scratch Awls:
Handled, Common. gro. $3.50@4.00
Handled, Socket. gro. $11.50@12.00
Hurwood 40%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights (up to 3½ lb.)
First Quality $6.25@6.50
Second Quality $5.75@6.00

Axle Grease—See *Grease, Axle*

Axles—

Iron or Steel
Concord, Loose Collar 5@5½¢
Concord, Solid Collar 5@5½¢
No. 1 Common 4@4½¢
No. 1½ Com. New Style 4½@5c
No. 2 Solid Collar 4¾@5¼¢
Nos. 7, 8, 11 and 12 60&5@60&10%
Nos. 13 to 14 60@5@60&10%
Nos. 15 to 18 60&10@70%
Nos. 19 to 22 60&10@70%

Boxes, Axle—

Common and Concord, not turned. lb. 4¼@4½c
Common and Concord, turned lb. 5@5½¢
Half Patent lb. 9@9½¢

Bait—Fishing—

Hendryx:
A Bait 20%
B Bait 2½
Competitor Bait 20&5%

Balances—Sash—

Caldwell new list 50%
Pullman 50&10@60%

Spring—

Spring Balances 60@60&5%
Chatillon's:
Light Spg. Balances 40&10%
Straight Balances 40%
Circular Balances 50%
Large Dial 30%

Barb Wire—See *Wire, Barb.*

Bars—Crow—

Steel Crowbars, 10 to 40 lb., per lb. 3@3½c

Towel—

No. 10 Ideal, Nickel Plate ₱ gro, $8.50

Beams, Scale—

Scale Beams, List Jan. 12, '85. 40&10%
Chattillon's No. 1 30%
Chattillon's No. 2 40%

Beaters—Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₱ doz. $0.85; Tinned $1.00
No. 11 Wire Coppered ₱ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized ₱ doz. $1.75
Western W. G. Co.
No. 1 Electric ₱ gro. $7.80
No. 2 Buffalo ₱ gro. $9.00
No. 3 Perfection Dust ₱ gro. $8.00

Egg—

Holt-Lyon Co.:
Holt, No. A, Japanned ₱ doz. $1.20
Holt, No 1, Tinned ₱ doz. $1.50
Holt, No. B, Japanned ₱ doz. $2.00
Holt, No. 2, Tinned ₱ doz. $2.25
Lyon, No 2, Japanned, ₱ doz. $1.25
Lyon, No. 3, Japanned ₱ doz $1.50
Taplin Mfg. Co.: ₱ gro.
No. 60 Improved Dover $6.00
No. 75 Improved Dover $6.50
No. 100 Improved Dover $7.00
No. 102 Improved Dover, Tin'd $8.50
No. 150 Improved Dover, Hotel $15.00
No. 152 Imp'd Dover, Hotel, T'd $17.00
No. 200 Imp'd Dover Tumbler $8.50
No. 202, Imp'd Dover Tumbler Tin'd $9.50
No. 300, Imp'd Dover Mammoth, ₱ doz. $3.00
Western, W. G. Co., Buffalo $7.00
Wonder (S. S. & Co.) ₱ gro. net, $6.00

Bellows—

Blacksmith, Standard List. 75@75&5%

Blacksmiths'—

Inch..	30	32	34	36	38	40
Eac h	$3.50	3.75	4.25	4.80	5.35	6.15

Extra Length:
Each $4.00 4.55 5.10 5.60 6.40 7.50

Molders—

Inch	10	12	14
Doz	$8.50	10.00	13.00

Hand—

Inch	6	7	8	9	10
Doz	$4.25	4.50	5.00	6.50	7.75

Net Prices.

Bells—Cow—

Ordinary goods 75&5@75&10%
High grade 70&10@70&10&5%
Jersey 75&10%
Texas Star 50%

Door—

Abbe's Gong 45%
Barton Gong 50%
Home, R. & R. Mfg. Co.'s 55&10%
Lever and Pull, Sargent's 60&10&10%
Yankee Gong 35%

Hand—

Hand Bells, Polished, Brass 60& @50&10%
White Metal 60%
Nickel Plated 50@5?&5%
Swiss 60@60&7½%
Cone's Globe Hand Bells 33⅓&33⅓&10%
Silver Chime 33⅓@33⅓&10%

Miscellaneous—

Farm Bells lb. 2¼@2½
Steel Alloy Church and School 50&10@60&5%
American Tube & Stamp'g Co. Gongs 75%
Table Call Bells 50@5?&10%
Trip Gong Bells 55&10@60%

Belting—Rubber—

Agricultural (Low Grade) 75@75&5%
Common Standard 70@70&10%
Standard 65@70%
Extra 60&5@60&10%
High Grade 50&5@50&10%

Leather—

Extra Heavy, Short Lap 60@60&5%
Regular Short Lap 60&10@60&10&10%
Standard 70@70&5%
Light Standard 70&10%
Cut Leather Lacing 60&10%
Leather Lacing Sides, per sq. ft. 18c

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender 40%
Green River Tire Benders and Upsetters 30%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.5?. No. 5, $20.50.

Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain 50%
Parts 50%
Spokes 50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—Tackle—

Common Wooden 70&10@75&5%
Hollow Steel Blocks, with Ford's Patent Sheaves 50&10%
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron 50&10%
Stowell's Self Loading 60%
See also *Machines, Hoisting.*

Boards, Stove—

Zinc, Crystal, &c. 30&10@40&10%

Bolts—

Carriage, Machine, &c.—

Common Carriage 75@ ?%
Phila. Eagle, $3.00 list May 24, '99 80&10%
Bolt Ends, list Feb. 14, '95 75@ ?%
Machine 75@75&5%
Machine with C. & T. Nuts 70&5@ ?%

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch	3	4	5	6	8
Per doz	$0.26	.30	.39	.47	.65

Cast Iron Spring Foot:

Inch	6	8	10
Per doz	$1.00	1.25	1.75

Cast Iron Chain, Flat, Japanned:

Inch	6	8	10
Per doz	$0.75	1.05	1.30

Cast Iron Shutter, Brass Knobs:

Inch	6	8	10
Per doz	$0.87	.90	1.00

Wrt Barrel, Jap'd. 75&10@75&10&10%
Wrought Bronzed. 50&5@50&10%
Wrought Flush, B. K. 50&10@60&10%
Wrought Shutter 40&10&10@60&5%
Wrought Square Neck 50@50&10%
Wrought Sunk, Flush 50@50&10%
Ives' Patent Door 60%

Stove and Plow—

Plow 65&10@ ?%
Stove 50&5@50&10&5%

Tire—

Common 75½&10@75½&10&5%
Norway Iron 80@80&10%
American Screw Company—
Norway Phila., list Oct. 16, '34 80%
Eagle Phila, list Oct. 16, '84 82½%
Bay State, list Dec. 28, '99 72½%
Franklin Moore Co.:
Norway Phila, list Oct. 16, '84 80%
Eagle Phila., list Oct. 16, '84 82½%
Eclipse, list Dec. 28, '99 72½%
Russell, Burdsall & Ward Bolt & Nut Co.
Empire, list Dec. 28, '99 72½%
Norway Phila, list Oct. '84 80%
Upson Nut Co.:
Tire Bolts 72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch	1¼	1½	1¾	2
Per doz	$4.30	5.00	5.75	7.25
Inch	2¼	2½		
Per Doz	$8.65	11.50		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each 25%

Boxes, Mitre—

C. E. Jennings & Co. 25&10%
Langdon 15&10%
Perfection ₱ doz. $30.00
Schatz 40%

Braces—

Common Ball, American $1.15@1.25
Barber's 50&10&10@60&10%
Fray's Genuine Spofford's 40%
Fray's No. 70 to 120, 81 to 123, 207 to 414 60%
C. E. Jennings & Co. 50&5&10%
Mayhew's Ratchet 60%
Mayhew's Quick Action Hay Patent 50%
Millers Falls Drill Braces 25&10%
P., S. & W. Co. Peck's Patent 60&10@65%

Brackets—

Wrought Steel 80&10@ ?%
Bradley's Wire Shelf:
Full cases 80&10&10%
Broken cases 80&10%
Griffin's Pressed Steel 80%
Griffin's Folding Brackets 70&10%
Stowell's Cast Shelf 75%
Stowell's Sink 50%
Western, W. G. Co., Wire 60&10%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—

Western, W. G. Co 90%
Wire Goods Co. 75@75&10%

Buckets, Well and Fire—See *Pails*

Bucks, Saw—

Hoosier ₱ gro. $36.00

Bull Rings—See *Rings, Bull.*

Butts—Brass—

Wrought list Sept., '96 30@30%
Cast Brass, Tiebout's 50%

Cast Iron—

Fast Joint, Broad 50@50&10%
Fast Joint, Narrow 50@50&10%
Loose Joint 70&5@70&10%
Loose Pin 70&5@70&10%
Mayer's Hinges 70&5@70&10%
Parliament Butts 70&5@70&10%

Wrought Steel—

Table and Back Flaps 75%
Narrow and Broad 75%
Inside Blind 75&10%
Loose Pin 75%
Loose Pin, Ball and Steeple Tip 90&20%
Japanned, Ball Tip Butts 70&10%
Bronzed Wrt. Nar. and Inside Blind Butts 55&10%

Extra 10@10&10%

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series 5%
1200 series 33⅓%
200, 300, 600 and 900 series 40&10%
Hendryx Bronze:
700, 800 series 40&10%
Hendryx Enameled 40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong per lb. 4@4¼¢
Sharp, 1 prong per lb. 4¼@4¾¢
Gautier, Blunt 4@4¼¢
Gautier, Sharp 4½@4¾¢
Perkins', Blunt Toe ₱ ₺ 3.6?¢
Perkins', Sharp Toe ₱ ₺ 4.15¢